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Classical and Scientific Studies,

AND THE

GREAT SCHOOLS OF ENGLAND.

By W. P. ATKINSON.

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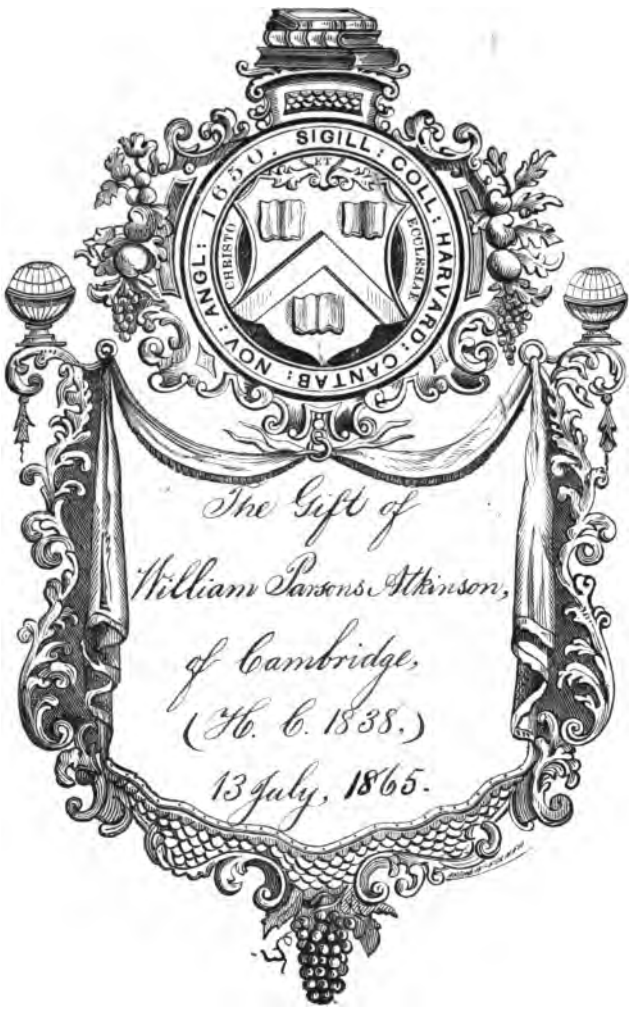

CLASSICAL AND SCIENTIFIC STUDIES.

Classical and Scientific Studies, and the Great Schools of England:

A

LECTURE

READ BEFORE THE SOCIETY OF ARTS

OF THE

Massachusetts Institute of Technology,

April 6, 1865.

By W. P. ATKINSON.

WITH ADDITIONS AND AN APPENDIX.

"Mutato nomine de te fabula narratur."

Cambridge:
SEVER AND FRANCIS.
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PREFACE.

It will be obvious at a glance that I have extended this paper quite beyond the limits of a lecture; and I ought to state, that for the sentiments, both of the part which was read, and of that since added, so far as they are not quoted from others, I am alone responsible.

For these sentiments, however, I can lay no claim to originality. The ground has been often traversed before; though, so far as I have dealt in controversy, I have endeavored to place the merits of both sides of the question in dispute in a juster light than is done by the extreme partisans of either. I have made copious references to my authorities, in the hope that those interested in the subject will follow up the reading of much that want of space compelled me to omit. In making up my account of the English schools, I have been able to embody in my pamphlet but a tithe of the interesting and valuable material that may be found buried in the folios of the original Report.

In taking upon myself the ungracious part of an advocate, I have had to lay grave charges of neglect and imperfection;

but I have endeavored, I hope not unsuccessfully, not to appear insensible to merits as well as defects. That the schools and Universities of England, with all their shortcomings, have yet done a great work in the past, no one can be so blind as to deny; no one, with any love of good learning, can be insensible to the influence of all the venerable associations that cluster round them. As seats of learning and centres of thought, they possess a power which hardly any amount of abuse or mismanagement can wholly deprive them of. *Emollit mores, nec sinit esse feros*, may be said of any course of liberal study, however antiquated or perverse. A mere residence at Oxford or Cambridge, one would think, should be a liberal education; and it may often be worth a young man's while to undergo any amount of useless drudgery, rather than miss the refining influence of the only higher intellectual training within his reach. My argument has only been that such a price should not be exacted of him.

But neither will it, I hope, be laid to my charge, because I have undertaken here to defend the interests of science, that I am insensible to the glory and beauty of the literatures of Greece and Rome, or to the splendor of their immortal story. That is a cause which will never lack defenders more eloquent than I am: yet, in one sense, I can claim that I too am its defender; for surely he may be reckoned among a cause's best friends who strives to protect it from perversion and abuse.

It has been my chief object to place before readers who will not have access to a document not likely to fall into the hands of many in this country, the very surprising picture of the great English schools which it contains, — schools, some

of which, at least, would seem at the present time to answer hardly any other purpose than that of serving as the demonstration, by a *reductio ad absurdum*, of the insufficiency of a one-sided and obsolete system of education. If I shall thereby contribute in any degree to the great work of building up a more perfect and more truly liberal one in this country, where, comparatively untrammelled by old traditions, we have a fairer field for experiment, I shall be abundantly rewarded.

W. P. A.

CAMBRIDGE, MASSACHUSETTS, May 21, 1865.

CLASSICAL AND SCIENTIFIC STUDIES.

I HAVE ventured, gentlemen, to offer, this evening, to draw away your attention from the special topics which usually occupy you here, to the great general topic, in which, as engaged in a new educational enterprise, we are all interested, —the topic of scientific education. You are about to organize a new institution, differing in many of its features from any other in the community: it seems fit, that, while doing it, you should view it in all its relations to the instrumentalities already existing. Have we a national system of education already completely organized? If so, in what relation does our enterprise stand to it? if not so, what bearing will it have on the solution of an undetermined problem? We cannot isolate ourselves if we would. Our institution must stand in some relation, true or false, to other agencies at work in different parts of the same great field. It is important that that relation should be a true one, and that the enterprise should be undertaken with wide and just views of the whole problem. Whatever light we can get from other systems and experiments, successful or unsuccessful, should be welcome.

Our President has recently made a thorough personal examination of those European schools of science which most nearly resemble, in their purpose and objects, the one you are about to inaugurate; and the benefits of his well-known skill and ability will soon be apparent in the organization of your school.

It has seemed to me, that we might derive some instruction from the examination, not only of those institutions which resemble, but of those also which differ most widely from, the one you are establishing; and that I could spend a profitable hour by bringing up the question here, which still plays so important a part in educational discussions, of the relative importance and relative position in modern education of the study of Physical Science, and the study of the ancient languages of Greece and Rome, which have so long formed the staple of the only education that has been called "liberal," — a well-worn question, I am aware, but one which from time to time will still present itself, to be passed upon anew in the light of the demands of new circumstances, and of the fresh conquests with which Physical Science, almost from day to day, astonishes the world.

In our noble system of elementary public schools, free alike to the children of rich and poor, white and black, foreigner and native, we have laid a foundation for the education of the people such as never was laid by any nation before; and though I think that many defects remain to be corrected, and much is still to be done before that system will develop all its power, yet, in the light of the great events that have been going on round us, the blindest cannot fail to see how much it has already accomplished to establish firmly the foundations of popular liberty, and to elevate us in the scale of nations. But the same attention does not seem to me yet to have been paid to the problem of adjusting our higher institutions of learning to the wants of a new people, and the circumstances of new times. That such adjustment is needful; that though learning be one, yet the instrumentalities by which it is promoted must vary with the times, and be adapted to the wants of the nation to be instructed, — will not, I presume, be questioned. But our higher institutions of learning are not of home-growth, but borrowed from England; a kindred nation, it is true, but one whose social system differs so widely from ours that few of her institutions can be adopted by us without modification. Yet,

while we have laid the broad foundation of a universal education of the people, such as England has yet hardly begun to dream of, in our higher institutions of learning, we have borrowed from her, almost unchanged, that narrow theory of a liberal education which is based exclusively upon the study of the Greek and Roman classics. It is to the question of the relation of this theory to American education that I wish to draw your attention.

But I should not, perhaps, have been tempted into so old a controversy, if there had not fallen in my way a document which seems to me to throw a new and most extraordinary light upon the whole subject. It may be known to you, that in England, in the year 1861, partly in consequence of severe strictures on the condition of Eton School, which appeared in the public prints,* a Parliamentary Commission was appointed to investigate the condition, not only of that great classical school, but of eight of the most important of the other so-called Grammar Schools of England; namely, the three other most aristocratic of these institutions, Harrow, Winchester, and Rugby, together with the old classical foundation of Shrewsbury, in the west of England; and Westminster, St. Paul's, Charterhouse, and Merchant Taylors', all in the city of London. Why these last were specially selected from the numerous other foundation-schools of England, does not appear. In 1864 that Commission made a Report, which I have studied with considerable care; and I propose to read to you an account drawn from it of the present state of public-school education in England, so far as it is exhibited in the condition of the schools examined, with special reference to the question which most nearly concerns us, — as to the place which the teaching

* Chiefly, if we may believe the "National Review," in consequence of the controversy which arose from some severe articles which appeared in the early numbers of the "Cornhill Magazine," by the "well-known and energetic reformer," who signs himself "*Paterfamilias*." I do not know who Paterfamilias is. The articles are well worth reading. "Cornhill Magazine," vol. i. p. 608; vol. ii. p. 641; and vol. iii. p. 257.

of science should hold in an enlarged and liberal scheme of modern education.

Now, we are not at present in very good temper with our English brethren, and with ample and just reason; and therefore not, perhaps, disposed to do justice to their real merits: but I think we may at any time allow, that Englishmen can challenge the world, not only in the magnitude of the abuses they tolerate, but also in the thoroughness with which they investigate these abuses when once they set about it. Whether they are equally thorough in applying the remedy may perhaps admit of question. But the doings of this Commission are no exception to the rule of English thoroughness. The Report and evidence I have before me in four folio volumes, containing two thousand pages, in double columns of fine print. The Commission, which consisted of the Earl of Clarendon, the Earl of Devon, Lord Lyttleton, the Hon. Edward Twisleton, Professor William H. Thompson, and Henry Halford Vaughan, Esq., held a hundred and twenty-seven meetings, examined at very great length a hundred and thirty witnesses, and personally visited all the schools; though an application from them for permission to examine the boys was met by a civil but peremptory refusal from all but one or two of the head-masters. I think there is hardly any question that can well be conceived, from the quality of that roast mutton to which, for centuries, Eton Collegers have been doomed for five days in the weekly seven, and the strength of the beer with which they wash it down, up to every possible inquiry respecting the history, income, revenues, and course of study of each school, that will not here be found answered; and, in addition, and what is perhaps the most valuable part of the whole, there is a great body of evidence from men of the highest eminence, called to testify to the general questions relating to the state of English education. It will readily be believed, that it is a very valuable contribution to the literature of education. My reading on the subject has been pretty extensive; but I have rarely seen any thing that goes so directly to the heart of all questions

that should interest a person engaged in such studies at the present day.

I shall not detain you with a description of these great schools.* Old charitable foundations, some of them with a somewhat monastic character, they have been diverted almost entirely from their original purpose, and are now, and notably Eton, Harrow, Rugby, and Winchester, — to which four I shall chiefly confine my remarks, — great boarding-schools, where the sons of the English aristocracy and wealthy classes are prepared, or supposed to be prepared, for the Universities of Oxford and Cambridge, or directly for the different spheres of English aristocratic life. The splendid buildings of Eton are well known by description, and have doubtless been visited by many here present.

Not to detain you, then, with a description in detail, I pass at once to the question which immediately concerns us; namely, What is the character, and what the quality, of the education given to almost three thousand of the sons of the English higher classes in these great and ancient and richly endowed† institutions? As they are the most prominent and wealthiest, it is to be presumed that they are, if any thing, above the average of many others of a similar character which are scattered over England. Will you permit me to answer it, by first asking, in a few words, What *ought* to be that education, and then examining in detail how far the actual education answers to the ideal?

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* For some details, see Appendix I.

† Richly endowed, though the dishonest manner in which the increase in the revenues of Eton, arising from the rise in value of its enormous landed property, has for a long series of years been diverted from its true object into the pockets of the Provost and Fellows, would be difficult to believe on any less conclusive evidence. That the first offenders were conscious of wrong-doing seems pretty evident, from the careful manner in which they concealed the statutes. Their successors have pleaded the excuse, which in England covers such a multitude of sins, — prescription. One Provost, before his death, returned a large sum to the College.

A practical psychology, founded on a true inductive observation of the phenomena of the human mind, such as should guide us in an *a priori* investigation of such a question, is yet to seek; * but I shall assume as axioms one or two propositions which you at least will not be disposed to question. I shall assume, that, in the science and art of education, we must study and follow nature, and that we shall only be successful so far as we do so. I shall assume, that there is a certain natural order in the development of the human faculties; and that a true system of education will follow, not run counter to, that order. I shall assume further, that, in the absence of any nicer classification, we may roughly divide the faculties of the mind, for purposes of education, into observing and reflective; and that, in the order of development, the observing faculties come first. And again, I shall assume, though the point has been disputed,† that individual minds come into the world with individual characteristics; often, in the case of superior minds, strongly marked, and qualifying them for the more successful pursuit of some one career, than of any other. Finally, I shall assume, without stopping to qualify the statement, that the study of the phenomena of the material world may be said to be the divinely appointed instrument for the cultivation and development of the observing faculties; while the study of the immaterial mind, with all that belongs to it, including the study of language as the instrument of thought, is the chief agent in the development of the reflective faculties.

This being premised, let us next inquire, from a practical rather than a theoretical point of view, what we should natur-

* I cannot make an exception in favor of the empirical system of Phrenology, though I believe it has served to draw attention to important but neglected principles in educational philosophy. The attempts of the German philosophers, Herbart and Beneke, to apply psychology to education can hardly be said to be known outside of their native country.

† As, e.g., by Dr. Johnson, who maintains, in his "Life of Cowley," that genius is only great *general* power, "accidentally determined" in a particular direction. All experience proves the contrary.

ally expect as some, at least, of the results of the education of a young English gentleman entering one of these magnificently endowed institutions at the age of ten, and leaving at the age of eighteen or twenty for the university* or the world? He enters it at an age, when, as we have assumed, the observing faculties are most active in their efforts to develop themselves. He doubtless finds there, to meet that want, the amplest provision which wealth can furnish for the practical study of outward nature, and for gaining at least an elementary knowledge of the wonderful laws by which the Creator governs the universe, in the shape of apparatus, laboratories, instruments, libraries, and teachers trained to use them. He is doubtless taught, as a discipline of the mind, to know and classify the living creatures round him, and to understand the physical phenomena in the midst of which he lives and has his being. The future citizen of one of the leading industrial nations of the world, himself perhaps heir to some great landed estate of vast natural resources, or to some great manufacturing establishment which has laid the foundation of his family's wealth and consequence; at any rate, the probable future legislator for these, — he will naturally be instructed in all those departments of science which have any bearing on these, which will help him to govern and guide them successfully, or to legislate for them intelligently. Born within that charmed circle from which the rulers of the people are drawn, he will begin to be instructed betimes in all that relates to the history, government, and politics of his own and other modern nations; a citizen of a great commercial nation, he will be taught something of the laws which control the distribution of wealth; the inhabitant of an island whose sails are found on every sea, and whose trade reaches to the ends of the earth, he will be well instructed, at an age when such instruction is

* In 1861, 558 out of 1,674, or exactly one-third of the under-graduates of Oxford, and 305 out of 1,483, or nearly one-fifth of those of Cambridge, were from public schools.

most easily imparted, in the geography, physical and political, of the globe he inhabits. Born heir to the noblest language and the richest literature of modern times, he will of course be carefully taught, from the very outset, to speak and write his mother-tongue with accuracy and ease; and, at the age of eighteen or twenty-one, he will be well acquainted with the great writers, in prose and poetry, who have adorned it. Connected closely with the nations of the continent, and likely, from his wealth and position, to be a traveller in after-life, he will be well acquainted with one or more of the leading continental languages, so as to read them readily, and perhaps even speak them fluently. Finally, an heir to wealth, with perhaps unlimited means at his command of gratifying his tastes, a foundation will surely be laid for the study and appreciation of the fine arts, by a careful cultivation of eye and ear, by drawing and music.

I will not exhaust the catalogue; but is not some or all of this, or the beginning at least of all this, what we have a right to expect from a young man of twenty, educated at these great, wealthy, and time-honored institutions, in order to satisfy that ideal of an education which Milton himself has drawn for them. "I call, therefore, a complete and generous education" — the words have been quoted a thousand times before — "that which fits a man to perform justly, skilfully, and magnanimously all the offices, both private and public, of peace and war"?

And now, gentlemen, though I am sure that the answer I am about to make to the question, How much of this is actually realized by these great schools? will create no little astonishment, I shall not give you the opportunity to suspect me of exaggeration; for I shall make no statement that is not fully supported by the document before me.

And as we have assumed it as an axiom in education, that the observing faculties are the first to be developed, and as boys enter these great schools at the very early age of eight or ten, let us first inquire how the case stands in regard to physical science.

The account of the study of physical science at Eton is as brief as that famous chapter in Horrebow on the snakes in Iceland. The Rev. C. O. Goodford, the Provost, testifies in these words: "Physical science is *not taught;*" and, a little further on, "There is no apparatus for experiments in natural philosophy, &c." We turn to Winchester, and the evidence of the Rev. Dr. Moberly, head-master, is the same; to Harrow, and read, "Physical science does not form any part of the regular studies of the school;" to Westminster and Merchant Taylors', with the same result: and it is not till we come to Rugby, where we should expect more enlightenment, that we find any attention paid to the subject, beyond a voluntary attendance on a few lectures; and, even at Rugby, it holds a very inferior place, counting little or nothing in the scale by which rank is determined, and therefore not really looked upon as a part of the serious work of the school.

The light in which modern science is viewed by the body of schoolmasters who govern these schools, is curiously brought out in the cross-examination of the Rev. George Moberly, for twenty-seven years head-master of Winchester. He says: —

It is plainly out of the question, that we should teach chemistry, astronomy, geology, &c. All that is, in my opinion, possible, and therefore desirable, to attempt, is that a course of lectures on each of the chief subjects of science in turn should be delivered in the school annually. . . . A few boys, who intend to pursue it in any way, either as amateurs or professionally, may get assistance from these lectures. An amateur of a science is the better for knowing the elements of it; and every man of liberal education is the better for not being ignorant of any thing: but, compared with other things, a scientific fact, either as conveyed by a lecturer or as reproduced in examination, is a fact which produces nothing in a boy's mind. It is simply a barren fact, which he remembers, or does not remember, for a time; and which after a few years becomes confused with other facts, and is forgotten. It leads to nothing; it does not germinate. It is a perfectly unfruitful fact. . . . Such instruction is worthless as education. *Qu.* Are the physical sciences not of value as a discipline of the mind? *Ans. I hardly know what their value is.* I do think it is very desirable that young people and old people should know these things. I think they are matters of accomplishment and knowledge which everybody should know something of. But as a mat-

ter of education and training of the mind, which is our particular duty as instructors, I do not feel the value of them.] . . . If we were going to make chemists, we would educate them in that way; but we want a general education, which will be introductory to other things, — things which would be of more general value: [*these things give no power.* (Vol. iii. p. 344, *et seq.*)

Upon being afterwards asked whether he does not "think that persons who have had a philosophical education are sometimes persons whose general powers of mind would lead him to believe that such an education goes beyond a knowledge of facts, — that it also leaves power and a high state of education generally," — he answers, that there certainly are scientific men of high capacity, and that he should wish any one who had *practical* views before him to cultivate those studies; but he seriously objects that modern science *is hardly yet seventy years old.**

Here, then, a surprising fact meets us at the outset. In the great schools of England, in the middle of the nineteenth century, the whole of modern physical science, one-half of knowledge as we just now divided it, — the whole study of the outward world, — is, I do not say, pursued imperfectly: it is not pursued at all; it is absolutely ignored as an essential part of education: and a head-master of twenty-seven years' standing can be found who says he thinks that as a training of the mind it is worthless! — it gives no power! We shall, by and by, see what the most eminent of English men of science think on that subject.

If we turn now to the study of the modern languages of Europe, we find this to be the Commissioners' account of the study of French at Eton: —

M. Tarver, the single teacher of French at Eton, . . . has no recognized position in the school, other than that of "a person holding the privilege to teach French," and describes himself — not untruly, as it seems — as "a mere *objet de luxe*. . . . He reckons his average attendance, which is mostly from the Fifth Form, at eighty, or about one-tenth of the school. . . . Whilst the number who learn is small, the teacher is embarrassed by obstacles which, from no fault of his, largely frustrate his efforts to teach. The study of French is comparatively useless, if not steadily kept up. Being optional at Eton, it is not pursued continuously, but by fits and starts; and, as it involves an extra

* See his evidence more at large, vol. iii. p. 343, *et seq.*

expense to the parents, and to the boy a sacrifice of some hours of play, we are not surprised to find that the attendance is often greatly reduced by the most trivial reasons. Being excluded from the school-work, it wants almost entirely the indispensable stimulus of reward and punishment. . . . French is not required, nor under the present head-master allowed, to assist a boy's rise in the school.

The opinion of the present head-master (the Rev. Mr. Balston) on this subject was expressed very distinctly in his examination: — (Lord Clarendon.) Would it not be considered necessary by the authorities of Eton to render obligatory a thing which they think ought to be a part of an English gentleman's education? — I should not. You would not consider it necessary to devote any part of the school-time to its acquisition? — No, not a day.

You do not intend to do so? — No.

Do you not think that it is a matter which a boy should be required to learn? — He ought to learn French before he came to Eton, and we could take measures to keep it up as we keep up English.

What measures would you take to keep up French? and, I may add, what measures do you now take to keep up English at Eton? — There are *none* at present, except through the ancient languages.

You can scarcely learn English reading and writing through Thucydides? — No.

(Sir S. Northcote.) You do not think it is satisfactory? — No: the English teaching is not satisfactory; and, as a question of precedence, I would have English taught before French.

You do not consider that English is taught at present? — No. (Vol. i. p. 84–5.)

The number of boys who learned German was twenty, out of seven hundred and eighty. The Italian master, Signor Volpe, reports himself as having *three* pupils. He apparently does not look for any such good fortune as to have pupils; but, in an amusing letter to the Commissioners, in rather imperfect English, he begs that he may have a room of his own allowed him, when he comes down from London, *to put his head in when it rains.* At Winchester, forty boys out of one hundred and ninety-seven learned German; but more attention was paid to French, though it counted nothing for promotion. At Harrow, the study of modern languages has been compulsory since 1851, and it counts something for rank: but it is not till we come to Rugby that we find a real attention paid to modern languages as an integral part of a good education; and even

there they are still in an inferior position, and the results are reported as very imperfect.

Here, then, we find the study of modern languages ranging through different degrees of imperfection; from absolute and almost ludicrous failure at Eton, up to something like a proper estimation at Rugby, but everywhere subordinate, and everywhere with imperfect results; and one head-master declaring that, if he could have his way, they should not be studied at all.

We come now to the study of the mother-tongue and its literature; a tongue which, if it had not paramount claims as the *mother*-tongue, would be second to none in power, or in the value of the treasures it contains. What encouragement is given to young English noblemen and gentlemen to master, and learn to appreciate, the language of Shakspeare and Milton and Bacon? We have already seen the importance attached to the study of English by that wonderful man, the head-master of Eton. He would have the boys' French kept up by the same measures by which their English was kept up; and, upon being pressed as to the measures by which English was kept up, it turned out that there were *no* measures, except the incidental one of translating from the ancient languages, which he had to confess was a very unsatisfactory measure, and in which it turns out afterwards that no pains is taken with their English at all. Here, then, is a pendant to the ideas respecting science of one head-master, in the ideas respecting English of another. French and English, according to the evidence of Mr. Balston, are treated with perfectly impartial, because absolutely complete, neglect; and, if we pass to the other schools, the case does not anywhere seem to be much better. A good deal of evidence was taken as to the tastes of the boys, as shown in their private reading; and here is a sample of it. It is from the evidence of Mr. Mitchell, a student at Oxford, who had just left Eton, after being there six years:—

Was there a good deal of private reading in general literature, as far as you know, at Eton?—I think very little.

There was no general desire for information?—No.

It was not considered any part of business or pleasure at Eton to keep up a reading of the general knowledge of the day?—No: I do not think so. (Sir S. Northcote.) Did they read newspapers?—I think those who belonged to the debating-society [twenty-eight in number] read them. I do not think the other part of the school did. (Mr. Thompson.) Do you think the majority of the boys had read the greater part of Sir Walter Scott's novels?—I do not know; I should think they had probably. Do you think they had read the principal poets, such as Shakspeare?—I do not think they read Shakspeare.

Much less Milton, I suppose?—No: I do not think they did.

They were obliged to read him a little, were they not, for verses?—Yes.

But, beyond reading over the passages set for Greek iambics and hexameters, you do not think Milton and Shakspeare much read?—No, I do not.

Would you say that the modern poets are read? Did you ever hear of any one reading Coleridge?—Some boys do; but I think, as a rule, most boys read nothing at all except novels, and books of that sort.

What sort of novels,—serial novels?—Yes. Thackeray's?—Yes.

Or would that be too difficult?—I do not think Thackeray is read very much.

Lever, perhaps?—Yes.

(Lord Clarendon.) Bulwer?—Yes.

(Mr. Thompson.) They do read a great many novels?—Yes.

(Mr. Vaughan.) How do they get the novels that they read?—They buy them; and then they pass about the house, from one boy to another.

It is the cheapness that determines the book selected, to a certain degree?—Yes, I think so.

The railway editions of novels, perhaps?*—Yes. (Vol. iii. p. 249.)

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* That it was not always so at Eton is proved by the interesting evidence of Mr. Coleridge, a nephew of the poet, and for thirty-two years a master. He says: "Formerly, any average boy of ordinary taste at Eton, on leaving school, had read much of the English poets, and a great deal of English history, as well as other literature. I know very well that the boys used greedily to devour every poem of Sir Walter Scott, Lord Byron, Southey, and other modern poets, as fast as they came out. I recollect that there was a perfect rush to get the first copies of the 'Corsair.' The boys used to spend a great deal of their pocket-money in buying English books: . . . we had them in abundance. The old English dramatists, a great deal of Dryden, a great deal of Pope, and an immense deal of other English poetry, were then read at Eton, besides most of the modern poems; but now I doubt whether you would find many boys out of the whole eight hundred that Eton contains who have read ten plays of Shakspeare."

Scott and Thackeray, then, being somewhat above their level, it turns out that yellow-covered literature is the staple reading of the boys at Eton; as one might suppose it would be in a school presided over by the Rev. Mr. Balston. Mr. Kitchin, Censor of Christ Church, testifies that a tolerable acquaintance with English literature is very rare among the young men who come to his college.

Let us turn now to the fine arts. I suppose all will acknowledge, that the discipline of the eye by drawing, and of the ear by music, are rapidly passing out of the list of elegant and ornamental superfluities into that of the necessary elements of a complete and harmonious training. One would think that in schools frequented by the children of an aristocracy, if nowhere else, special attention would be paid to them, if only as luxurious accomplishments beyond the reach of the vulgar. Yet at Eton, the most aristocratic of schools, though there is a drawing-master, and though, more fortunate than the unlucky Italian master, he has a room, and even some casts and models, the average attendance on his instruction is thirty-five out of seven hundred and eighty-three. Music is not taught at all. In the report on Winchester, no mention is made of either. At Harrow, music and drawing are extras, studied by eighteen and fifty, respectively, of the four hundred and sixty-four boys. Even at Rugby, the numbers are only forty-nine and forty-two in four hundred and sixty-five. This, then, is the amount of attention paid in these great schools to the fine arts, and to the cultivation of eye and ear.

Geography, after a little elementary instruction, is wholly neglected. Attention is paid to ancient history at some schools, in connection with classical work: but at Winchester, Dr. Moberly says, "we do not profess to teach modern history at all;" and the case seems no better at the other schools, though no such open confession of failure is made.

I have thus gone over nearly all the list of studies which we assumed to be such as ought to enter into the education of an English gentleman; and thus far, you observe, with next to

no result. What, then, *do* these great schools teach? I need not give the answer. In place of all these, they teach Latin and Greek; and, subordinate to these, mathematics.* To these three studies, or rather to two, Latin and Greek, almost the whole teaching force of these great institutions is applied. Of the thirty-five masters at Eton, twenty-four, or about seventy per cent, are classical; eight are mathematical; and *three* teach all the modern languages, physical science, natural history, English language and literature, drawing and music: and this is about the proportion in all save Rugby, where matters are somewhat better.

And the defenders of the classical system of education maintain that this is all as it should be. Classics, and, in a very subordinate degree, mathematics, are the divinely appointed sharpeners of the human intellect. The mind won't *cut* till it has been ground on what a facetious Scotch schoolmaster* calls the "gerund-stone." It is in vain to attempt to teach boys any thing, say the advocates of this system, till their minds are *disciplined;* and the only mental discipline for boys is Latin Grammar, and then Greek Grammar, and a little mathematics. When they know all about the Greek accents, and the perfect passive participle, and the doctrine of the subjunctive mood, and the choruses in Sophocles, they may, with some propriety, begin to inquire why a stone falls to the ground, or what is meant by the carboniferous formation, or what are the merits of a republican form of government, or any other merely utilitarian piece of knowledge. To judge by the manner in which they have lately been handling that last problem, one is forced to conclude, that even the adult English aristocratic mind has not yet got through with its preparatory grinding.

Let us for a moment examine this argument; for it still plays an important part in educational controversies, and is the main subject I propose to illustrate in this discourse. I shall

* D'Arcy W. Thompson, in his genial and scholarly "Day-dreams of a Schoolmaster."

assume as granted one of those axioms with which I set out; namely, that in the art of education we must study and follow nature as our guide. How, then, if this be true, will the case stand as to Latin Grammar? Clearly, if it is the divinely appointed food for the youthful mind, there will be developed, at about the age of eight or ten, a strong love and aptitude for it; and this will be indicated by the zeal with which children will enter upon its study the moment it is presented to them, and the ease and pleasure with which they will master it. It will be absorbed, so to speak, at every mental pore; and their intellects will visibly enlarge under its benign and nourishing influence. They will leave their dinners to study the subjunctive mood, and cry to sit up nights, that they may master the gerund in *dum*, and the periphrastic conjugations, and the mysteries of protasis and apodosis; and, as a natural consequence, we shall abound in admirable young Latin and Greek scholars, to whom not a nicety of expression nor a shade of meaning in those languages will be unknown. Beginning at eight, and continuing the study uninterruptedly till twenty-one or twenty-four, without the distraction of any more vulgar studies to interrupt their entire devotion to their object, they will, of course, both speak and write the Latin and Greek languages with fluency and ease; and will be familiar with all the beauties of the great authors of Athens and Rome, whatever they may *not* know of the great authors of England. And, when the time for science does come, these minds, so long and so admirably sharpened, will cut into its profoundest depths, and know its utmost secrets, as if by intuition: at least, if they do not know them thus, there will be but little time left for learning them in any other way. Whether this proves to be the result, the evidence of men eminent in science will presently show.

But how does the case really stand in regard to this natural love of the boyish mind for Latin and Greek? Alas! the dogs-eared and dirty grammars — *amo*, *amas*, whipped, so to speak, into the wrong end of the person, because it finds

such difficult entrance at the right, — seem to point to a different conclusion. And at this very time, when, according to theory, there should be such an aptitude for Latin Grammar, what do we find, if we show our youngster an air-pump, explain to him the working of a steam-engine, set him upon collecting birds' eggs, or unfold to him the wonderful structure of an insect? — why, the liveliest curiosity and interest in our teaching. Boys are not mere animals, to whom all sorts of intellectual effort are equally repulsive. That is a theory of boy-nature, which is the worthy and necessary complement of the grindstone theory of instruction. Give a boy the food his mind really craves, and you will find him an intellectual being.

What, then, is the moral? Why, that air-pumps and birds' eggs, steam-engines and butterflies, *are* factors in education equally with the Latin Grammar; and that, in a true order of development, they precede the Latin Grammar: in other words, that the observing faculties are not developed in the same way and by the same means as the reflective; and that the observing faculties are developed *before* the reflective. This is sad heresy, gentlemen, in the ears of our classical pedants; but I cannot help it. Nature will have it so.

Now this being so, — and I do not see how any one can well dispute it, — is it natural to suppose that a system which carefully keeps from the minds of boys that mental food they crave, and insists upon supplying only that which their minds most strenuously reject, can be followed by good results? Do we know better than nature? And will not the depriving of their observing faculties of their natural development, when these faculties are strongest, and the premature development of their reflective faculties at an age when they are weakest, be likely to produce dwarfed or distorted minds? and, when that process has been carried on for several years, shall we be likely to mend the matter by *then* attempting to cultivate the observing faculties, just at the period when nature meant that the reflec-

tive powers should come into play, and take their first and strongest outgrowth? Yet, preposterous as it seems, this is, as I propose to show you, a favorable view of what in England is called a *liberal* education. What its results are, we shall also see.

I am aware that I am saying what it will be very easy to misunderstand; and I desire, therefore, to add, that I say it as a defender, not an opponent, of classical studies. I think the time is not coming, and that it would be unfortunate if it should come, when classical studies will be altogether abandoned. They must always hold an honorable place, and play an indispensable part, in any far-reaching and wide-embracing scheme for a liberal and generous education. But classical studies will not be really appreciated, or take their true place, or develop the vast educational powers they really possess, till they are relieved of the degrading task to which they are now universally put, of serving as the intellectual whetstone upon which to attempt to sharpen little boys' wits.

I will add further, that I think it is not too much to admit, that the defenders of the classical theory have heretofore had greatly the advantage of their opponents, in the line of argument they have taken in defence of their favorite studies. Disagree with them as you may as to what studies go to make up a liberal education, you must yet go to them for a true definition of that training of mind in which a liberal education consists. The advocates of science have been too prone to confound education with information, mental training with "useful knowledge:" they have lost sight of that liberalizing development of all mental powers which constitutes a true education, and which no mere pouring in of any amount of useful information can ever accomplish. "It is not a little curious," says Mr. Pattison, in an admirable paper in the Oxford Essays,* "in reviewing the controversy on classical education,

* For 1855.

which has been going on for the last fifty years, to note, that, though the inevitable progress of things is gradually but silently giving a preponderance to the modern sciences, the advantage has, till quite lately, been with the defenders of classical studies. The untenable position of the public schools and universities has been supported by the classicists on a true principle, while the sound cause of scientific knowledge has been mostly argued by the naturalists on a false one. The classicists have not only written well, and brought out in a clear light many of the secondary benefits of the dead-language training, but they have held to the fundamental idea of intellectual culture as the great end of education. Their error has been their not understanding that the study of antiquity, of the past, even when much more profound than it usually is, cannot *now* convey that culture. Their opponents, on the other hand, in the free possession and enjoyment of that wonderful field of real knowledge, have lost sight of the truth, that, for the purposes of education, knowledge is only a means, — a means to intellectual development. They will stake the issue on the comparative *utility* of the classics and of science; *whereas they ought to place it on the comparative fitness of the two subjects to expand the powers, to qualify for philosophical and comprehensive views.*"

This seems to me to be eminently true; and I am quite ready to admit, that I know of no definitions of education that can compare, in justness and breadth of view, with those given by some of the defenders of classical studies. In the old controversy between Oxford and the "Edinburgh Review," in spite of the power of Brougham and the wit of Sidney Smith, the victory, it seems to me, for this reason really remained with the defenders of the old system.* And if I were asked to point

* See in particular the "Remains of the Rev. J. Davison," or his admirable article on R. Lovell Edgworth's foolish book on Professional Education, in the "Quarterly Review" for 1811.

out the modern books on education which are marked by the truest appreciation of that wherein a real training of the mind consists, I should have to mention, among the foremost, the writings of such men as that arrogant but able scholar, the late Dr. Donaldson; and the lectures on University Education of Father Newman, the excellence of which, I may say in passing, is wholly due to the early *Protestant* training of their acute and able author, — their greatest defect, the attempt to bring down his thought to the level of his new creed and his uncultivated audience.

I am willing, then, to draw my definition of education from my opponents; but I do it only to turn it upon themselves. Granting their ideal of a liberal education to be the true one, — and I grant it cheerfully, — their means of realizing it are utterly inadequate. The end of education being, as they say, a true and symmetrical mental development, the means must be something of far wider application and greater power than the grammar of two dead languages. Let us adopt their ideal, then, but seek out better and more adequate methods of realizing it. But, to omit altogether the training which the study of language gives, would be to err as gravely, and to show ourselves as one-sided, as our opponents. And the study of the classic languages of Greece and Rome, in their proper place and at their proper time, must always take a prominent part in linguistic training. The place, the time, the proportion in which they should enter into different schemes of teaching; the part they should play in the teaching of language itself, — are questions of detail, on which I will not enter here. I desire only to express my conviction, that there is no necessary antagonism between science and classical study; that both are needful factors in a wide-embracing system of liberal education; that it is the preposterous abuse of classical study, and the absurd neglect of science, that we have to consider and try to remedy; and further, that, considered as instruments of mental discipline, there is surely no necessary connection between classics and thoroughness, science and superficiality, though in

all discussions this seems to be taken for granted by the advocates of classical studies.*

It is curious to revert to the times when these same classical studies, now become the chief staple of what may be called the orthodox education of the day, were themselves considered the worst of heresies, and decried by conservatives as an innovation destructive of all sound learning; and to observe what an exact parallel there is between their treatment and the treatment which science, as an instrument of education, receives now. "For above two hundred years," says Mr. Hallam,† speaking of the University of Paris, in the middle of the fifteenth century, "the scholastic logic and philosophy had crushed polite letters. . . . When the concession [that the new studies should be taught] was made, the teachers of Greek and rhetoric were specially excluded from the privileges of regency by the faculty of arts. These branches of knowledge were looked upon as *unessential appendages* of a good education, very much as the modern languages are treated in our English schools and universities at this day. A bigoted adherence to old systems, and a lurking reluctance that the rising youth should become superior in knowledge to ourselves, were no peculiar evil spirits that haunted the University of Paris, though none ever stood more

* In the whole mass of writing in favor of classical studies, it is more difficult to find any thing approaching to the nature of an argument than one would suppose. Such writing usually consists in a panegyric on the beauty of the classic poets, — which no one is disposed to deny, — and a disparagement of the study of science as the mere cramming of utilitarian facts, — which serves only to show the writer's ignorance of the true nature of scientific studies. The distinction attempted to be drawn by Dr. Whewell, in his work on a Liberal Education, between "permanent" and "progressive" studies, and the argument he attempts to build upon it, seems to me, with all deference to the opinions of a writer of such eminence, more fanciful than sound. The reader may compare with it the opinions of Professor Owen. (Appendix, p. 106.)

† Hallam's History of Literature, i. 123, Paris ed. See also, on this subject, Raumer Geschichte der Pädagogik, i. sec. 3; and Schmidt, Gesch. d. Päd., ii. 336, *et seq.* But the classical education of Eton would have made Erasmus stare.

in need of a thorough exorcism. For many years after this time, the Greek and Latin languages were thus taught by permission, and with very indifferent success."

But opposition to the new studies was vain. At the time of the revival of letters in Europe, in the fifteenth century, the study of classical literature opened a new career to minds that had so long been pent up within the narrow bounds of the mediæval philosophy. We cannot wonder at the impulse which was given to the intellect of Western Europe by the sudden revelation of a world of thought rich in all the elements that were wanting in the dry and barren schoolmen. But the position of the classics is now reversed, and their relation to the learning of the present day is precisely the relation of scholasticism to the thought of the fifteenth century; and just as scholasticism, merging all of truth that it contained in a wider philosophy, had to submit to the abandonment of its monopoly, and to become only an insignificant element in a wider curriculum, so the pedantry of classical learning must disappear before that wider modern study of *language* which is fast taking its place; while language itself, however important it may be as an element, — and no one can dispute its importance, — must yet content itself with forming *only* an element in an education which must find a place in its wide-embracing scope for the whole extent of modern science. Nothing short of this can put it in a true and living relation to the wants of the times. To continue to employ the classical languages as the sole instruments of teaching, is as impossible as it would be to return to stage-coaches in these days of steam. "The best form of discipline," say the Commissioners, "may not be the same in the nineteenth century as it was in the sixteenth; and the information which will be serviceable in life is sure to be very different. Hence no system of instruction can be framed which will not require modification from time to time. The highest and most useful office of education is certainly to train and discipline; but it is not the only office. And we cannot but remark, that, whilst in the busy world too great a

value is perhaps sometimes set upon the acquisition of knowledge, and too little upon that mental discipline which enables men to acquire and turn it to the best account, there is also a tendency which is exactly the reverse of this, and which is among the besetting temptations of the ablest schoolmasters; and that, if very superficial men may be produced by one of these influences, very ignorant men are sometimes produced by the other." (Vol. i. p. 30.)

I am combating, then, neither classical nor linguistic studies, which I value, and whose true power I have had some opportunity to observe, but only the *abuse* of classical studies. I do not know whether I am addressing any gentleman who has ever been engaged in classical teaching. If I am, it may have been his experience, as it has sometimes been mine, to take a lad who has at a rather late moment determined to prepare himself for College, and whose mind, instead of having been previously dosed *ad nauseam* with grammars, has had a healthy development through employment on more congenial studies. I think he will agree with me, that a year at the age when the powers of reflection and abstraction begin to strengthen; when the rationale of the laws of speech can be appreciated, and language can be viewed, not as a tedious mass of dead words, but as the living instrument of human thought, — that a year spent upon the classics at that age by a young man who knows his own and perhaps some other modern language, is worth any three of previous life for such studies. "We do amiss," said Milton long ago, — and Milton was a learned classical scholar, — "we do amiss to spend seven or eight years in scraping together so much miserable Latin and Greek, as might be learned otherwise easily in one year."

I do not believe the *grindstone* theory. I am not going to dispute the doctrine, that some studies have a greater disciplinary value than others,* though the relative disciplinary

* See on this point an excellent note in Sir William Hamilton's "Discussions," p. 705, Am. ed. I do not wish to dispute the justice of the

value of different studies remains, I think, still in great degree to be ascertained by careful experiment and observation; and it would be about as reasonable to attempt to cultivate a farm with a pickaxe, as to educate all the faculties of the mind by one study alone. But the implied doctrine of our classical extremists is, that there is one set of studies for discipline, and another set for use; and that the disciplinary value of a study is always in inverse ratio to its practical value for the purposes of life, and *vice versa*. Now, if you will allow me to use a homely illustration, suppose we

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distinction there drawn between such studies as consist chiefly of "results to be taken on trust" from the few students who are in position to make such subjects a specialty, and such studies as actively exercise other powers than the memory; as, e.g., to use the author's illustration, "the *rational* study either of the grammar of a known language, or of universal grammar illustrated by the languages with which a student is acquainted." It were better if this last study, "an applied logic and psychology," which Sir William declares to be wholly neglected at English universities, were more attended to at our own. It is because Physical Science has been so little looked upon as also an applied logic of the most valuable kind, that its educating value has been overlooked.

What Professor Goldwin Smith says ("Lectures on History," I. p. 27) of the subjects of higher education is true to a great extent of all education, that, to be available for teaching, such subjects "must be traversed by principles, and capable of method; either a science or a philosophy, not a mere mass of facts without principle or law:" which last is the classical pedant's idea of physical science.

I think it is Dr. Acland who raises the question, Which is the *more* valuable of the two as to educating power, — the rational study of languages, or the inductive study of physical science? But not to urge, that, as employing to a great extent different faculties of the mind, the two studies may almost be said to be incommensurable, and that to speak of any educational instrumentality as of universal application is, as I have said, almost as absurd as to speak of a universal tool, it may certainly be maintained that the question will not be ripe for decision till science shall have been employed as long, and with as perfect means and appliances, as has the study of the ancient languages. Then it will be found that both language and science are *equally* indispensable to a perfect education.

On the educational value of the Physical Sciences, see Whewell, Phil. Ind. Sc., ii. 359.

were to say to a penny-postman, "My good friend, you do very wrong to start out on your daily task of delivering letters, so early in the morning, without a previous *walk for exercise*," — our postman would be very apt to say, "My dear sir, I get more than enough exercise in the course of my daily duty." "Oh, but" — we can imagine the rejoinder — "that is mere vulgar, useful labor! You should spend the whole morning, and a good part of the forenoon, in purely *disciplinary* exercise of your legs; then, towards the middle of the day, you might begin to deliver your letters with some prospect of doing it *secundum artem*." I fear our postman would argue, that, if the Creator had intended so much time to be occupied in fruitless preliminaries, he would have made the hours of daylight longer. Yet this is hardly a caricature of the defence of classical studies we sometimes hear. As if, the moment there were the least prospect of a study becoming practically valuable, it thenceforward became worthless for mental discipline! As if there were one set of studies whose whole use was to sharpen the mind, and then another whose sole value consisted in their subservience to the vulgar, utilitarian purposes of life! You, gentlemen, who know something of the intimate connection which exists between the profoundest problems of pure science and the homeliest details of every-day practice, will believe in no such theory. It is a theory which betrays its parentage. It can come only from a country where the privileged classes, born to great wealth, and thus above the necessity of labor, desire to possess some shibboleth of their order, too costly and difficult of attainment to be within the reach of the man born only to useful toil and the divine necessity of working for the good of his fellow-men; and that shibboleth they get from a study, — not even a real and profound, but a useless and superficial study, — during all the years of youth and early manhood, of two ancient languages, to the almost complete exclusion of every other subject. Classical studies are not to be defended, at least in a republic, upon any such theory at this. If they are valueless in themselves, they

had better not be used for discipline: if they have an intrinsic value, — and, in their proper place and time, I maintain that they have the highest intrinsic value, — it is upon their real merits that they must claim a place in a true system of education. Practical usefulness, — and by that term I do not mean the mere vulgar stomach and pocket filling with which it is so often confounded; but practical usefulness in a high and generous sense, the serving of all noble and worthy objects, the endeavor to make our earth a better dwelling-place, and man a nobler dweller on it, — practical usefulness in this sense should be the very aim of all our teaching; and study can never lose sight of it without most imminent peril of becoming worthless for discipline as well as for use.

If, then, you should advise our imaginary postman to exercise his arms, to develop symmetrically, as far as possible, all the muscles of his body, I should not have a word to object. My point is only this, that the delivering of letters itself has a disciplinary value for the legs, as well as a pecuniary value for the pocket; and, *quoad hoc*, he can combine discipline and duty together. For I believe God meant that our *whole* life should be an education, our daily labors should be disciplinary; and so, instead of degrading liberal education down to the level of a vulgar utilitarianism, I would elevate the idea of life to the height of a true liberal education. Then, no matter how soon we begin to combine these ideas together. But can *such* a liberal education be formed out of Greek and Latin Grammars alone? *

But to return to our schools. If every thing save mathematics is sacrificed, as we have seen it is, to the indispensable disciplinary Latin and Greek, we shall at least have thorough and accurate classical scholars. If the mathematics, more

* A late writer (Fornereau, "Diary of a Dutiful Son") says, with more wit than science, "Most men seem to consider their school-learning as if it were like a tadpole's tail, meant to drop off as soon as the owner came to full growth."

fortunate than physical science, have a recognized, though an inferior place in the curriculum, we shall at least get good mathematicians. Let us, then, examine the results in classics and mathematics.

The study of mathematics is a modern innovation. "Before 1836," the Report says, "there was no mathematical teaching of any kind at Eton:" it did not become part of the regular school business till 1851; and the following story would be incredible, if it did not rest upon the authority of Professor Key, of University College, London. I find it in the evidence of that eminent physiologist, Professor W. B. Carpenter:—

"I remember hearing Professor Key, of University College, mention that he had in early life a private pupil who had gone through the complete Eton course, which at that time was only classical. Even ordinary arithmetic was not taught, much less any mathematics; and he happened to find out accidentally, that this young man, an intelligent young man in other respects, not only had never learned his multiplication-table, *but did not know there was such a thing as a multiplication-table.* He was buying several pairs of silk stockings in a shop; and, to find out how much he had to pay, he was adding the price of one pair to the second pair, and that to the third pair, and so on. When he found how much his labor would be facilitated by the multiplication-table, he applied himself to master it, and learned it off in a few days with the keenest pleasure." (Vol. iv. p. 368.)

This was the state of things in the largest of these schools within the recollection of a man of middle age. Mathematics do now, however, form an integral, though still a very subordinate, part of the course of instruction. The mathematical masters at Eton are to the classical in the proportion of eight to twenty-seven; they do not wear the same costume, and have not the same power over the boys: one of them complains rather bitterly that the older boys themselves have more power than they. The subject does not count so much for rank, and in every way the boys are taught to look down upon the study as of quite inferior importance. It is no great wonder, therefore, that the results are reported as far from satisfactory. The attention given to the subject at the other schools varies; but in none is it on a par with classics. At Westminster, the

classics count as two-thirds, and *all* other studies as one-third; and promotion is not given at all for proficiency in mathematics. At Harrow, mathematics were not introduced till 1845; and it takes four mathematical marks to equal one classical mark. At Rugby, three and a half hours per week are devoted to the study, and it stands to classics as twelve to seventy-eight; and all the great prizes are for classical proficiency.

We are reduced at last, then, to Latin and Greek alone. Surely we shall have classical scholars. The percentage of time devoted to classical study in all these schools is so great that it is hardly too much to consider them the sole instrument of education. If, in addition to that, you consider that rank in the school is almost exclusively determined by it, and the prizes to be gained by rank, both at school and at the universities, are many and very valuable, you will see that the whole arrangement has the effect of an enormous system of *bounties* for the encouragement of this one branch of study. Here, then, if anywhere, we shall find results that bear some proportion to labor expended and opportunities enjoyed.

Now, it would be absurd to deny that all these great schools do send up to the Universities a certain number of pupils with as thorough a training of its kind as can well be given. Whether it is the best kind, even of classical training, we shall presently inquire. Certainly no one will undertake to deny that England contains good scholars. But the education, gentlemen, of the able minority is never a true test of the worth of a system or of the character of a school; for the able minority is made up of those minds of native strength and originality that will get themselves an education without a system, or in spite of the worst of systems. If to these you add a certain number of drudging pedants, who will, at any rate, load their minds with learned lumber, and to whom the quality of the lumber is indifferent, provided it leads to the desired fellowship, you can have a show of success for any large school, however bad it may really be. But the true merits of a school are determined by what it does for the great mass of average

minds. Does it truly train and educate them? is the question; and, viewed in this light, all the evidence goes to show that the English classical system is a portentous failure.

I do not state this as a mere opinion. It is the inevitable conclusion to be drawn from the evidence itself. The Commissioners, acting upon the principle that a tree is known by its fruits, very properly summoned before them tutors and examiners from the various Colleges of Oxford and Cambridge, to testify as to the state of preparation in which the young men came up to those Universities; and these gentlemen tell a very lamentable story. Here are some specimens of their evidence.

The two Colleges at Oxford which receive the great majority of Eton boys are University and Christ Church. Of University it is said by the "London Review," that for the last ten years the average number of men from this College who attain a first class in classics has not exceeded *one* in a year. "Its whole vital energy is exhausted in producing this unit; and even that unit is not always an Etonian." And the following is a part of the evidence of the Rev. Charles Sandford, Senior Censor of Christ Church. That of the Dean was quite as unfavorable.

"Some fifty or sixty young men matriculate at Christ Church in the course of each year. Of these, perhaps ten will read for honors in classics. Such men would be able to construe with tolerable correctness a new passage from any Latin and Greek author, translate a piece of easy English prose into tolerable Latin, and answer correctly simple grammatical and etymological questions in Latin and Greek. *The other forty or fifty would not.* In fact, very few of those who are merely candidates for matriculation can construe with accuracy a piece from an author whom they profess to have read. We never try them in an unseen passage. It would be useless to do so. They are usually examined in Virgil, Æn. I. — IV., and Homer, I. Il. — IV. . . . We do not test their knowledge of ancient or modern history, or of geography, at matriculation. We examine them in arithmetic, but not in Euclid or in algebra. Their answers to the questions in arithmetic do not encourage us to examine them in Euclid or in algebra. . . . Very rarely is any one heard, in the public examinations, to translate fluently into good English. This is no doubt owing partly to the universal use of translations, partly

to the little weight attached by the examiners to this faculty." (Vol. ii, p. 10.)

The Rev. G. W. Kitchin, the Junior Censor, says, "Of the ordinary men a quarter might possibly steer their way through an unseen passage in Greek with fair success. Rather a larger number might manage an ordinary piece of Latin. Tolerable Latin prose is very rare. Perhaps one piece in four is free from bad blunders. A good style is scarcely ever seen. The answers we get to simple grammar questions are very inaccurate. In arithmetic they have improved, as it is now understood that they cannot pass responsions without it. We do not examine for matriculation in any of the other subjects mentioned. . . . While youths of the age of eighteen (our average age at matriculation) have in other institutions already chosen their course of life, and are beginning to prepare for it, our men have the duty of making such a choice almost concealed from them, — certainly never insisted on by the University course of studies; nor do they enjoy the stimulus of knowing that what they are doing will directly affect their future career. They work to pass certain examinations; they pass, and in a short time forget the cram — it is often little else — on which their indifferent minds have been employed." (Vol. ii. p. 12.)

The Rev. James Riddell, Tutor of Balliol College, says, "Five-sixths of the pupil-teachers in schools, receiving aid from Government, are better *readers* than five-sixths of the men who come to the University. Again, in one of the examinations in Literis Humanioribus, in which I was an examiner, nearly half of the passmen who came under my notice were imperfect *spellers*." (Vol. ii. p. 16.)

The Rev. W. Hedley, Tutor of University College, and Public Examiner, says, "I am sorry to say, that many boys come to the University from school, knowing next to nothing. . . . I have sometimes had to remind my brother examiners and myself, *in the final examination for B.A.*, that we were not at liberty to pluck for bad spelling, bad English, or worse writing. . . . Hitherto it has seemed useless for the University to enlarge her course to suit the tastes of men whose minds have never been formed at all by any methodical teaching, and who really cannot be said to have any tastes. . . . It is difficult to say what proportion of candidates for matriculation can translate a new passage of a Latin or Greek author. At my own College, we consider such a test much too severe: the College would be left half empty, if it were insisted on. . . . Of arithmetic and mathematics few of them know any thing more than the amount insisted on by the University, and many of them barely that; the extent of their knowledge not reaching beyond vulgar fractions and decimals. . . . Their acquaintance with history is very meagre, and so exceptional that, where it does exist, I should be induced to attribute it more to domestic training and individual taste than to the systematic teaching of schools. Much the same may be said of geography. (Vol. ii. p. 17.)

The Rev. W. H. Girdlestone, of Christ's College, Cambridge, says, "To the latter portion of the question I consider myself to be a living answer. For eighteen years, I have found employment in supplementing, as a private tutor, the deficiencies of school-education, and in teaching the simplest rudiments of arithmetic, algebra, and elementary mathematics, and in preparing in Latin and Greek candidates for the previous examination and ordinary degrees; and I cannot but think that I have to teach them nothing but what they ought to have been thoroughly taught at school. . . . I may call attention to the fact, that, for the last two years, rather more than *one-third* of those who entered at Trinity failed at the first entrance examination. With regard to arithmetic, I can testify, from my own experience, to the almost universal ignorance of the simplest first principles of the subject; and may state, that, at the previous examination in October, 1862, there were eighty-six decided failures in arithmetic and algebra out of two hundred and sixty candidates; while, in the examination for the ordinary degree, in June, 1862, one examiner found in the translations from the Greek author *mistakes in spelling* in the papers of ninety-one candidates out of one hundred and sixty-one." (Vol. ii. p. 30.)

Charles Neate, Esq., M.P., Fellow of Oriel College, Oxford, says, "There are now so many things which a tolerably educated man ought to know, that there is not room for Latin and Greek, at any rate for *both* of them, unless they can be taught in less time than they are now. Yet these languages are now so ill taught, or at least are so little known by the great majority of those who are supposed to have learnt them, that half the time now bestowed upon their acquisition would be a great deal too much to give for the result obtained.

With reference to this latter point, I do not hesitate to say, that the great majority of those who take a degree in Oxford, after having spent ten or twelve years of their life in the all but exclusive study of Latin and Greek, are unable to construe off-hand the easiest passages in either language (if they have never seen them before); and that their Latin writing is almost invariably such as would, under the old school-system have subjected them to a flogging, as boys of twelve years old; and those who take first classes often make such mistakes as make it difficult to understand how they ever got simply a degree." (Vol. ii. p. 49.)

In the examination of the head-master of Eton, there occurs the following passage: — (Lord Clarendon.) The Dean of Christ Church says, that boys come up from Eton who are not only not proficients, but who are in a melancholy state of deficiency in respect to classical learning. — (Mr. Balston.) This may be; and, if so, there is need of improvement.

(Lord C.) Nothing can be worse than this state of things, where we find modern languages, geography, history, chronology, and every thing

else which a well-educated English gentleman ought to know, given up, in order that the full time should be devoted to the classics; and, at the same time, we are told that the boys go up to Oxford, not only not proficient, but in a lamentable state of deficiency with respect to the classics. — (Mr. B.) You asked me what my opinion was, and I was stating what I thought I should be able to do. — (Lord C.) What we are now aware of is this: that at present the whole time of the boys is devoted to classics; notwithstanding which, we have the principal of one of the first Colleges in Oxford telling us, that, generally speaking, almost all the boys come up in a melancholy state of deficiency in respect to these classical attainments; and that, among those so painfully deficient, Eton stands prominently forward.

(Mr. B.) I am sorry for it.* (Vol. iii. p. 114.)

And here is the guarded conclusion of the Commissioners themselves; and the more weight should be attached to it, as, throughout this Report, they show themselves exceedingly cautious and moderate men: —

"If a youth, after four or five years spent at school, quits it at nineteen, unable to construe an easy bit of Latin or Greek without the help of a dictionary, or to write Latin grammatically; almost ignorant of geography, and of the history of his own country; unacquainted with any modern language but his own, and hardly competent to write English correctly, to do a simple sum, or stumble through an easy proposition of Euclid; a total stranger to the laws which govern the physical world, and to its structure; with an eye and hand unpractised in drawing, and without knowing a note of music; with an uncultivated mind, and no taste for reading or observation, — his intellectual education must certainly be accounted a failure, though there may be no fault to find with his principles, character, or manners. We by no means intend to represent this as a type of the ordinary product of English public-school education; but, speaking both from the evidence we have received, and from opportunities of observation open to all, we must say, that it is a type much more common than it ought to be." (Vol. i. p. 31.)

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* Trevelyan, the clever author of a recent entertaining work on India, the "Competition Wallah," says, "Of two hundred scholars who leave Eton in the course of the year, it is much if some three or four can construe a chorus of Euripides without the aid of a translation, or polish up, with infinite pains, a piece of Latin prose, which a Roman might possibly have mistaken for a parody of the De Officiis, composed by a Visigoth in the time of Diocletian." p. 424.

The public, if we may judge from its various organs of opinion, has gone a step farther than the Commissioners, and *has* accepted this picture as a type of the ordinary product of English public-school education, at least in regard to Eton, which, though the largest and richest, is certainly the worst of the schools.

Here, then, is a ridiculous failure even in the classical teaching itself; and though the general cause of it has been already indicated, in the view we have been taking of what constitutes a true and natural education, yet the immediate causes of such a lamentable result seem to deserve a moment's further examination of the nature of the classical teaching itself. For it cannot be denied, that, though classical study alone can never form a complete and perfect mental training, yet, in skilful hands, it may be made the means of a very tolerably good one. Let us imagine a school shipwrecked on a solitary island, or walled up in some old monastery, and thus cut off from all knowledge of modern life and access to modern literature; but with a cargo of Greek and Roman authors, and a sufficient supply of dictionaries, grammars, and other illustrative and critical apparatus. Surely, good teachers should make something of them. With the grammars of two kindred languages, and with a knowledge of their own (perhaps this last is too great an assumption), they could teach something of the philosophy of speech, and make their pupils understand that grammar is no arbitrary matter, — the work of old Lily, or of any Connecticut schoolmasters, — merely to be crammed into the memory as a collection of dead, arbitrary rules; that grammar was not made first, and then the language made to fit it, — as one might suppose from the way languages are usually taught; but that as language is the divine and wonderful instrument of thought, so grammar is, or should be, the philosophical analysis of that instrument, and thus the ground-work of an exposition of the laws of thought. Highly abstract as the study is in its very nature, yet it can be taught intelligently, if pains enough be taken,

even to children, though whether it should be is open to grave doubt.* Let any one take a tolerably clever child, and first making one grand bonfire of all the school grammars that can possibly come within his reach, — and, if certain grammars that I might name were among them, I would make the fire tenfold hotter, — let him proceed to analyze to him the first half-dozen sentences the boy utters, carefully abstaining from pedantic technicalities, and he will have gone a great way in laying the foundation of grammatical knowledge; and, with a little skill, he can carry the process a great way further before the child need even hear of those terrors to the youthful mind, Lindley Murray and his successors. And what shall hinder our imaginary teacher from continuing the process, and teaching the laws of Greek and Latin Grammar practically and rationally, even though it were as yet too much to expect that he should be master of that new science of Comparative Philology, which is destined sooner or later to revolutionize our teaching. Once taught to read the languages of Greece and Rome, our shipwrecked boys would have, in the subject-matter of the classic writers, material for the exercise of their faculties in very various directions. They could learn history from Herodotus, Livy, and Thucydides; politics from Aristotle; eloquence from Demosthenes; and philosophy from Plato. The politics, to be sure, would be antiquated; the morals, unchristian;† and the progress the world has made in eighteen

* Our excellent Dr. Benjamin Rush, in the "Observations on the Study of the Latin and Greek Languages," to be found in his Essays, says (p. 45), "Sancho, in attempting to learn to read by chewing the four and twenty letters of the alphabet, did not exhibit a greater absurdity than a boy of seven or eight years old does in committing grammar-rules to memory, in order to understand the English language." The learning a language by attempting to learn all its grammatical minutiæ *first*, has been aptly compared to the attempt to teach a child to walk by sitting down and attempting to teach him the anatomy of the muscles of the legs.

† It might be a curious question to investigate what effect the exclusive study of the Greek and Latin classics has had in the political

centuries would all have to be ignored. They could even acquire some rude notions of physical science, and the beginning of classification in natural history, from Pliny and Aristotle; and in Euclid they would have a geometry not yet superseded. In the careful practice of turning Greek and Latin into good idiomatic English, they would have, not the best certainly, but a very good training in their mother-tongue. And in the study of the severe beauty of the Greek poets, they would have a discipline of their taste, such as perhaps no other literature can give, — provided always they ever attained to such proficiency in the language as would enable them to appreciate its more delicate graces; a proficiency really attained, I presume, by about one in ten thousand of those who study the language.

I have gone into this little sketch because it is precisely the way in which the classics are *not* taught in the great schools of England. First, for the elements of Grammar,* we are told by the University examiners, that they are not learned at all. Next, for the subject-matter of the classical writers, we have the evidence of no less a man than the famous Master of Trinity, Dr. Whewell, — and he is the more impartial witness, as, though eminent as a man of science, he is a warm upholder of real classical study, — that the subject-matter of the classical writers is called "cram," and is wholly neglected; and, finally, various witnesses testify that little if any pains is taken to form a good English style, by the careful and elegant translation of Latin or Greek into English. You will begin

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thought of Europe. The eminent French economist, Bastiat, has, written an ingenious pamphlet — "Baccalauréat et Socialisme" — to show the pernicious influence they have exerted on French political speculation, particularly as exhibited at the time of the first French revolution. (*Œuvres*, tome iii.) And see also his lively letter on founding a classical College at Bayonne (tome vii).

* The Eton Grammars are so bad that they find no sale outside the walls of Eton itself. "We affirm without the least hesitation," says an English critic, "that the two Eton Grammars are marked by almost every fault under which such treatises can labor."

to ask in despair, What, then, do the boys learn? The answer is brief, and it is this, — that their chief mental occupations are, first, the committing of a quantity of Greek and Latin verse to memory, so great that Dr. Acland, another eminent witness, calls it "frightful;" and, secondly, the manufacturing themselves of vast quantities of Greek and Latin verses, or what are called verses; which is usually done with the help of a "Gradus," and, in point of educational value, is about on a par with the operation of turning the handle of a barrel-organ.

I feel that I ought to sustain such statements by evidence. The following is from that of Dr. Whewell. Sending, along with his communication, a copy of his able work "Of a Liberal Education," he says:—

"I have also made various remarks on the defective character of the classical teaching of our great schools; the whole attention of the scholar being employed in obtaining a knowledge of the *language* of the classical author, with no attention to the *matter*. I have made these remarks in the first part, and have noticed the manner in which schoolboys in these days ridicule all knowledge of the matter of books as *cram*. In the second part, I have quoted the testimony of an eminent person, formerly a classical medallist, to the truth of the picture which I had drawn, of the narrowness of the scheme of classical scholarship prevalent in our great schools.

"I have ventured further to say, that, though to write Latin *prose* is a necessary part of scholarship, to write Latin *verse* is not equally necessary. The very great amount of time and care which is bestowed upon this accomplishment is disproportioned to the value of it as a condition and element of an exact knowledge of the Latin language. Probably many of the best Latin scholars who have ever lived would not write Latin verses so classical in their tone and measure as some of our Eton schoolboys. Still more are the writing of Greek prose and Greek verse accomplishments which are not necessary to the scholar;* and it cannot be doubted, that a most exact knowledge of Greek may exist in persons

* I find the following striking corroboration of Dr. Whewell's statement: Porson, perhaps the greatest Greek scholar the English ever had, *was not at all distinguished at Eton.* "He was inaccurate in his prosody, — *a fatal defect;* and his Latin verses, almost the only road to distinction, were never remarkable." — "*Etoniana*," *in Blackwood, March*, 1865.

who could not fluently translate Addison into Greek prose, or Pope into Greek verse.

"The great amount of time and attention which is bestowed upon these accomplishments in this University has, I think, an unfavorable effect upon the knowledge of classical literature which our scholars acquire; and I think that the same must be the case at our public schools where this kind of exercise is cultivated. Our scholars call it, I find, *composition*. The result of its occupying so much of their time is, that they bestow comparatively little of their time and thoughts upon the reading of Greek and Latin authors with a view to their matter. They are much better acquainted with the Greek and Latin written by themselves and their companions, than with any Greek and Latin written by ancient authors, except the few who are selected as models of style or sources of phraseology."* (Vol. ii. p. 43.)

The character of much of this Greek and Latin composition may be estimated by the evidence of another sensible witness, Archdeacon Denison. In a paper suggesting improvements in the present methods of instruction, he says: —

"I should discard the practice of Latin-theme writing. Few things so intrinsically absurd have, I think, been imported into school-teaching. For it calls upon boys to do two things at once which are not compatible: *1st*, To think out a subject; *2d*, To express their thoughts in a language other than that in which they think. The result is, as a general rule, what might be expected, that they do neither the one nor the other moderately well, and that so many themes begin with *omnes homines*, and struggle on through fourteen gasping and despairing lines to *faciunt*.

"Now, if the principal use of an exercise be to make a boy think, he should be allowed to express his thoughts in the language in which he thinks. The result of any other requirement is only unmeaning platitudes and poor and stunted expression. If, on the other hand, the use be to teach a boy the idioms and the elegances and the power of another language, or even to familiarize him with the words of it, this is best done by translation; well done by written translation; better done by oral translation.

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* The reader who would see Dr. Whewell's views more at large is referred to the above-named work, "Of a Liberal Education," and especially to the chapter on Classical Educational Studies (p. 78), and on the Great Classical Schools (part ii. p. 63, edition of 1850). See also his Lecture in the volume of Lectures on Education, delivered at the Royal Institution in 1854.

"The same, *mutatis mutandis*, for Latin and Greek verse-writing. To call upon all the boys of a school to exercise imaginative power, which most of them do not possess, in the poetical garb of another language, with which they are at the best very imperfectly acquainted, is only an ingenious device for exposing dulness and incapacity, and a temptation to hate poetry altogether." (Vol. ii. p. 50.)

Mr. Twisleton interrogates the Rev. Mr. Oakes, one of the masters at Eton, as follows: "Was it not the case, that, among the boys, taking say one hundred boys, there would be a large proportion who possessed no turn for Latin composition?" and the answer is, "A great proportion of them."— "So that," Mr. Twisleton continues, "if the time of one hundred boys were taken up by Latin composition, there would be a sacrifice of a great number of boys to the attainment of excellence in some,"—excellence, you observe, in writing, not English prose, but Latin verse. But Mr. Oakes can only say, "As a matter of *discipline*, I doubt whether it would be well to give it up."

Mr. Walford, another Eton master, testifies, "We neglect, to a very great extent, the careful analysis of the argument and the digesting thoroughly the subject-matter of the books we read;" in other words, they are in the habit of reading Latin and Greek books without understanding their meaning. And, as if this were not enough, he goes on to say, that no attention is given to nicety of translation; and then that the boys would learn more, if it were not for what he calls the "thoroughly established practice of allowing them to come into school with the English translation, *written word for word over the Latin and Greek*." Anybody who has ever heard a boy attempt to recite an ill-understood lesson from what we in Cambridge call a "pony," can understand their state of intellectual development, and their style of English composition, after several years of such discipline. Absurdity could hardly be carried further, and we no longer wonder at the evidence of the Oxford tutors.

But while the subject-matter of classical literature is thus neglected, and exactness and elegance of translation into Eng-

lish held in no esteem, the quantity of Latin and Greek words committed to memory is something enormous, and almost incredible. Dr. Moberly testifies, that he has known a boy repeat a whole play of Sophocles without missing a word; and adds, that it secured him a fellowship. The Commissioners say: —

The quantity of Latin and Greek poetry learnt by heart is, as has been already stated, very large. Speaking generally, every such lesson which is construed is also [supposed to be] learnt by heart. A boy has to say eighty lines of Homer, and sixty lines of some other author, alternately, five days in the week. Mr. Balston sets a high value on this exercise of memory, as an unfailing test of industry, and "a thing which they cannot get done for them at any rate." Granting this, as well as the great advantage both of "recitation" (properly so called) and of storing the memory from the classics, the question would still remain, whether the suggested purpose requires or is best answered by the repetition of three or four hundred Latin and Greek verses, and those only, in every week. We have reason, however, to think that even as a test of industry it is sometimes deceptive; that the manner in which the repetition is heard by no means insures its being learnt; and that the quantity exacted has very often the effect of making the exercise of memory mechanical and slovenly, and therefore worse than useless. When Mr. Walter was at school, "a quick boy learned the half-dozen lines or so that he thought he was likely to be called up to say, and got off in that way." He believes that there has been a great improvement in this respect; but his impression is hardly borne out by a witness whose experience is very recent.

(Mr. Vaughan.) Do you know how many lines a week the Latin and Greek repetition would amount to at the top of the school, say high in the Fifth Form? — I should think between two and three hundred lines.

Could that be easily shirked by a boy? — Boys have very seldom learnt it. They have got a way of guessing the piece they are likely to have.

Are they called up in order? — Yes.

So that they could get piping hot four or five lines, and be ready with it at the proper moment? — Yes.

Do you think that the repetition set to the boys to learn told really and effectively upon the composition, by giving taste and facility? — I do not think it did.

(Mr. Twisleton.) That could be frustrated if the masters were in the habit of setting on boys out of order, and dodging them? — Yes, if they did not go straight through the lessons.

(Mr. Thompson.) A master would be very unpopular if he interfered with that routine, would he not? — He would, decidedly. (Vol. i. p. 88.)

We need not be surprised to find not only that this kind of classical teaching does not give any command over English, but to hear Dr. Acland testify that it is positively disastrous to classical scholarship itself.

Our astonishment at this state of things will perhaps be somewhat diminished, when we read the following description of the mode of education and appointment of the Eton masters. "These gentlemen," says a late article in the "Edinburgh Review," * are, we believe, always selected from King's College, Oxford; that is to say, out of twenty-one masters now at Eton, about sixteen are King's men, as well as the provost and six out of seven of the fellows. It is admitted, that until lately the fellows of King's College were not generally of a stamp calculated to furnish first-rate masters for any school.† They entered Eton, when mere children, by favor; they were grossly neglected and ill-educated while they remained there; they were elected to King's by seniority; and, when at Cambridge, they kept aloof from the general society and studies of the place, and, living in a College notorious for the laxity of its discipline and the idleness of its members, encountered none of the public examinations of the University. Returning to Eton at four or five and twenty years of age as assistant-masters, without any knowledge of the world or experience in tuition, they were at once entrusted with the instruction of two or three times as many boys as the most practised and accomplished schoolmaster would have attempted to educate elsewhere. Having themselves learnt at Eton and Cambridge nothing but Latin and Greek, they could teach nothing else; and they consequently despised and decried all other branches of learning. In due course of time, other collegers, as care-

* Vol. cxiii., April, 1861, p. 417.

† King's College, with a revenue of $125,000 a year, admits annually from *five* to *twelve* undergraduates.

lessly educated by such teachers, became in their turn assistant-masters at Eton themselves, whilst their immediate predecessors undertook, as provost and fellows, the government of the College; and thus the vicious circle has been perpetuated from age to age."

But I shall expect you to begin to say: The thing is incredible; you are proving too much. It cannot be that this great number of boys should be herded together without receiving any education at all. Observe, gentlemen, that I have nowhere said that these boys received no education at all; and now, having gone over all the parts of that education which they do *not* receive, let me proceed very briefly to describe the education which they do.

Let me premise that the moral standard, at most of these great schools, seems to be very high. The evidence, in the main, goes to show, though evidence of an opposite kind is not wholly wanting, that the boys are healthy, frank, manly, and, on the whole, singularly free from vice. The famous system of "fagging," of which it was said not many years ago, that it was "the only regular institution of slave-labor, enforced by brute violence, which now exists in these islands," and to which may perhaps be attributed something of that bullying spirit and reckless disregard of right which has characterized the ruling classes in their intercourse with other nations, — still exists; but, save at one school, Westminster, it is stripped of nearly all its old brutality, and amounts to merely a wholesome supervision and protection, exercised by the older boys over the younger, in return for which certain menial services are performed, of which, as the aristocracy seem to set great store by* their educational value, one is not disposed to grudge them the benefit.

* In the "London Daily News" for June 7, 1864, may be found the report of a curious debate in the House of Lords, on the subject of the discipline of the public schools, in which Lord de Ros spoke in the highest terms of the benefit he had derived, while at Eton, from the operation of cleaning the shoes of a right reverend bishop, who sat

Now, in any great collection of boys or young men, if the organized and accredited system of education should prove unsuitable and a failure, you may be sure that an unorganized and unaccredited system will be established by the boys themselves. At such an age, their bodily activity must have fair play, if their mental does not. If they are turbulent and vicious, they will give themselves an education in vice. If they are merely healthy and active young animals, they will be sure to organize a system of vigorous and manly sports; and this is the real education of these great schools. The studies of *this* curriculum are, first and foremost, *cricket;* second, and hardly less important, rowing; and, as subordinate elementary studies, racket, hare, and hounds, &c., of which we read such glowing accounts in "Tom Brown." You may smile at this as a jest; but listen to the evidence. Mr. Johnson, an Eton master, testifies that cricket has become such a grave and serious science as to require special trainers, professors, as it were; and that the needful practice consumes twenty-seven hours per week. We shall see that another master puts it higher. Mr. Wolley says, that, *cæteris paribus*, the captain of the boats or the captain at cricket is a far greater hero than the Newcastle scholar. Mr. Mitchell, a young Oxford student, lately from Eton, says, —

"A boy has no chance of becoming one of the leading boys of the school by work. If he can do any thing else, — if he can row or play cricket, or any other athletic game, — I do not think he is *thought the worse of* for reading." And Mr. Walford, one of the masters, gives the following evidence: —

(Mr. Thompson.) Would you say, that, in fine seasons of the year, a boy spends more time in work or in play? — More in play, I should think.

Do you know if it is the case that five hours are considered barely sufficient for cricket? — I should think it was.

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opposite. The insolent self-sufficiency of the British aristocracy is such, in spite of disciplinary boot-blacking, that it is a curious inquiry, what it would have been if untempered in early youth by that useful economical experience.

That a boy cannot attain the proficiency in cricket, which at Eton a boy aspires to, without five hours a day study of it? — I should think so.

How long will that boy study Greek and Latin who devotes five hours a day to cricket? — Not very long: there are, however, some exceptions.

Would it not require a boy of strong constitution to read six hours a day in the classics, after having studied five hours in cricket? — Yes.

You think the masters are overworked: are the boys sufficiently worked? — It seems to me to be the result of our system at Eton, that an immense deal of work is got out of the masters, with comparatively little out of the boys. (Vol. iii. p. 267.)

Did I go too far, then, in saying that this unrecognized education has really taken the place of the recognized one? One would think, that the authorities, having regard to the etymology of the word, had convinced themselves that a school was a place, not of study, but of *leisure;* and it is a question whether that is not the theory which best satisfies the demands of the parents themselves. "The real advantages derived from Eton," says the Senior Censor of Christ Church, Mr. Sandford, "is less intellectual than social education. Eton is expected to make a boy a gentleman, and this expectation it fulfils. It may be added, that many boys are sent to Eton, not to learn, but to form connections." Compared with the police-spy system of French, or the Jesuit-priest system of Romish, education, no one would hesitate to which to give the preference; but, intellectually, do we not see its legitimate results? For whence come, but from these schools, those innumerable English Nimrods, who betake themselves, through lack of intellectual culture, to wandering up and down the earth, destroying wild animals, lions and elephants in Africa, buffaloes in our prairies, and bears in Norway, yachting to the North Pole, and in a thousand ways endeavoring to work off that superabundant animal life which has no intellectual life to balance it? Or whence comes that solid but silent phalanx of Tory lords and country gentlemen, who, in Parliament, so steadily and persistently strive to keep the world from moving, — who fought for the Corn Laws, fought against the Reform

Bill, and now are fighting us, — who are they but these ignorant young cricketers, grown up, and *not* come to years of discretion?

And I might go on to ask, Who is it but the boys who swallow Greek plays whole for the sake of fellowships, that compose that Convocation of country parsons who think that geology tends to atheism because it contradicts Genesis, and even now are striving to silence Bishop Colenso and Professor Jowett? For, so far from this state of things in regard to the intellectual education of these schools being impossible, I will engage, if you will give me several hundred thousand dollars to be expended every year in premiums on the best acquaintance with the words of the Chickasaw language, — if, for instance, a knowledge of Chickasaw words could be made to lead straight to five-thousand-dollar sinecures in the Custom-house and the public offices, — I will engage to have half the community studying that aboriginal tongue, and its teachers defending it (and the kindred Kickapoo dialect) as the divinely appointed foundation of all human education; and a thousand arguments shall be found to prove their peculiar adaptability to that special purpose. Now, this is just the position of the ancient languages in English schools and Universities. They are, it is true, at the other extreme of the scale of languages: they have an intrinsic educational value; but their place as the *sole* instruments of education is maintained entirely by the enormous system of bounties which is connected with the learning of them. Fellowships, scholarships, church-livings, the masterships in these very schools (and we have seen how lucrative they are), — all the means of promotion to which an English literary man or clergyman must look, are absolutely dependent, not so much upon his real knowledge of the substance of Latin and Greek literature, as upon his skill in making Greek iambics, or the rate at which he can grind out Latin hexameters, or the number of Latin and Greek verses he can repeat by heart. The result of repeating a whole play of Sophocles, we have seen, was a fellowship for life; which was, to use Dr.

Moberly's own words, "the prize of a struggle which was over at fourteen, and success in which was won, in a great measure, by a hard strain on a retentive memory." And Oxford and Cambridge are little more than cock-pits on a larger scale, and for older combatants to engage in contests of the same kind. Can any thing be more preposterous than to call this education? But, on the other hand, when the prizes are so great, can we wonder that there is a never-failing supply of combatants, — not from the best minds of the nation, who, intent on *real* knowledge, scorn to prostitute their talents to such base purposes; but of second-rate and vulgar men, who are ready to travel any road that offers them a prospect, however distant, of a bishopric?

The English classical system, therefore, is a protected monopoly of the strictest kind. The manufacture of Greek and Latin verses is fostered by a system of bounties that are almost prohibitive of any other style or quality of teaching; and they lead to the inevitable result of a system of high bounties and strict protection, — the production of a surplus of very costly and very worthless goods, and the prevention of all improvement by the destruction of all competition.

But, it will perhaps be asked, "If this is the condition of English education, whence come the real scholars and well-educated men that we know England possesses?" And certainly, after the recent visit we have had from one distinguished English scholar,* we cannot doubt that even Oxford can produce men eminent alike for learning and for large-hearted love of liberty. But I have to say in answer to the query, first, that I fear that such scholars are really much rarer in England than is commonly supposed; and that the English aristocracy, as a body, are *not* well educated.† The evidence I have adduced is

* Professor Goldwin Smith.

† It is to be observed, that, even in classical learning itself, it is to Germany, and not to England, that we look for real additions to our knowledge. The best critical editions of the classics in use in England are mainly the work of German scholars.

sufficient to prove it; and, if by nothing else, it has been of late abundantly made evident by the events of the passing hour. Our English brethren, it is true, bear us no good-will. In their eagerness to monopolize the commerce of the world, they hate a nation which threatens to be their rival; in their efforts to sustain the overgrown and now tottering power which they have built up through their conquests and their colonies, they are jealous of a nation which may at any time dispute their arrogant pretensions.* But I do not think that this is sufficient wholly to explain their base conduct towards us in our late struggle to emancipate ourselves from the demon of slavery. Common prudence, if no higher motive, would have counselled a well-educated nation not to make such indecent haste to grant the rights of belligerents to a band of assassins and men-stealers, in comparison with whom all previous traitors are as angels of light. Ordinary wisdom, if not good feeling, should have prevented them from equipping and sending out, under the hypocritical cloak of a pretended neutrality, armed cruisers to prey upon the commerce of a friendly nation, if their education had taught them any thing of its real power. A small share of ordinary knowledge would have been enough to prevent them from indulging in the taunts and insults which have embittered against them for generations a kindred people who ought to be their friends. I can wholly account for their conduct only by their gross and stupid *ignorance*, — an ignorance on the part of their ruling classes — for it is of their ruling classes that I here speak — such as perhaps nothing but an Eton training in longs and shorts can explain; an ignorance in branches of knowledge, with which no man who would do a man's work in the world can dispense, such as would disgrace an American schoolboy. One of their Reviews said, recently,

* When I speak thus of the English people, I mean, of course, that portion — I fear a very large portion — whose sentiments are represented by the "London Times." So long as that infamous paper shall have the power and enjoy the popularity it possesses, so long we must hold the English people responsible for its opinions.

that there were not ten men in the House of Commons who were acquainted with the rudiments of the science of political economy; and another has lately asserted, that there was not a minister in the British Cabinet who had the least knowledge of physical science. One more addition to these deficiencies could surely be made, — a general and very great deficiency in their knowledge of civil and political geography, as shown in their estimate of the true character of one at least of the leading nations of the world.

But, in the next place, I think it is evident that a large number of the best scholars and most eminent men of England are — as I shall presently show — not the product of her public schools, but either self-educated or privately educated men; to whom we must certainly add many who, by strength of genius, or by pursuing an independent course at school and College, have got a real education; or who, by toughness of intellectual fibre, have survived, perhaps not wholly unharmed, the utmost injury that a bad system could inflict. And, lastly, there are, both at the public schools, and still more at the Universities, conscientious and laborious tutors, men of admirable genius, who, by the excellence of their private teaching, protect their pupils from the mischiefs which the system would otherwise occasion. It is such a man that Oxford has lately been endeavoring to *starve* for heresy, as she can no longer burn him.*

But, in the ablest of her University men, can we not often detect the defects of her University training? What but Oxford narrowness could have produced such a Tory as Earl Derby? Is his translation of Homer an offset for his blind and bitter hatred of freedom? What but that makes even Mr. Gladstone† — if we may believe Englishmen themselves —

* Professor Jowett.

† Mr. Gladstone's whimsical argument in favor of classical studies is well criticized in the articles on the Public Schools Report in the "National Review" for November, and the "Edinburgh Review" for July, 1864.

fall short of being a statesman and a real leader of the people? — what but that habit of refining, of hair-splitting, which leads him, after enunciating a great principle to-day, to retract it or fritter away its force to-morrow, the fault and weakness of a narrow literary culture? Would a real statesman ever have called the rebellion of slave-holding assassins "the creation of a new nation"? What power less potent than Oxford bigotry could have plunged one of the greatest of her sons in this generation into the doleful abyss of worn-out Romish superstition? That is a sad page in biography that records the advice of his Oxford friends to the truly great and large-hearted Arnold, to swallow his doubts, and sign the thirty-nine articles; and can we not trace the marks of the fetters it threw around his spirit for ever after? What takes away from our enjoyment of the genius of his son, but that narrowness, that *priggishness*, which seems inseparable from the mere belles lettres scholar? In such a training, there is, to use the words of the Camden Professor of History, "a want of solidity, of acquaintance with mankind, and so of practical power, which makes the finished scholar often an inefficient and useless man." *

And the results would seem to be beginning to alarm the English aristocracy themselves. The appointment of this Commission, and of the equally important University Commissions which preceded it, appears to have been one fruit of that alarm. While the lower classes, through the stimulus that has been given of late years to the efforts for their education by large appropriations of money, are steadily rising in the scale of intelligence, in spite of a clumsy bureaucracy and bitter sectarian quarrels; while the great, active trading and manufacturing middle-class are giving themselves a real education,†

* Vol. ii. p. 14.

† "During the last four years," says Rev. B. Price, Sedleian Professor of Natural Philosophy at Oxford, "I have become acquainted, through the Oxford local examinations, with the standard of knowledge of mathematical subjects possessed by boys belonging to the middle-

—the aristocracy, equipped with merely this ornamental sham, are steadily declining in power and influence. If you will turn to the 132d vol. of "Hansard's Debates," the volume for 1854, you will find a remarkably able speech, by Mr. Horsman, on this subject, delivered during the debate on the Report of the Oxford University Commission; and in the volume for 1855 there is a report of the debate in the House of Lords on the same subject, in which the old Tory ex-chancellor, Lord Lyndhurst, who was surely an impartial witness, said, "I think that the Universities exert much less influence, and have a far weaker hold upon the public feeling of the country at the present day, than it was their good fortune to possess at a not very distant period. When I first entered public life, I found in the other House of Parliament that a majority of the members of that assembly had been educated at one or the other of the Universities. Now, however, as I understand, not more than one-sixth, or at most one-fifth, of the representatives of the people have been educated at either of those great institutions." * Mr. Heywood, in his book on Academical Reform,† referring to the destruction of mental vigor, occasioned by a false system of education, says, in regard to the legal profession, "The old type of the academically distinguished judge is hardly to be found; self-taught and energetic genius has invaded the field of legal promotion, and the course of University study has become too laborious and exhausting for young intellects." And, in the "Social Science Transactions" for 1859,‡ the Rev. Foster Barham Zincke, a gentleman well known for his enlightened advocacy of popular education,

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class schools; and I find it, for extent and accuracy, far superior to that which is exhibited by the candidates for matriculation from public schools who come under my notice. These latter can, in many cases, scarcely apply the *rules* of arithmetic, and generally egregiously fail in questions which require a little independent thought and common sense." (Vol. ii. p. 24.)

* Hansard's Debates, third series, vol. cxxxvii. p. 1715.

† p. 181. ‡ p. 287.

himself an Oxford man, testifies as follows: "I live in the neighborhood of a strictly agricultural town, the capital of an agricultural county; but of its population, now amounting to forty thousand souls, I am not aware that a single individual, except the clergy [to whom it is indispensable, as otherwise they cannot receive ordination], has received a University education. Probably the educated classes of the enterprising manufacturing town in which we are now assembled (Bradford) show the same practical disregard of our Universities. It is to the requirements for holy orders, and the hopes of a fellowship, that the Universities now owe their very existence. Every year the proportion of the members of the two Houses of Parliament, of the bar, and of the gentry, that have received a University education, decreases. The fact is patent to all, that they have lost the hold they once had on the educated classes."

This view will be corroborated if we consider how many of the most influential minds of the century, in science, literature, art, and politics, have either had no connection whatever with the Universities, or are under small obligation to them for any connection they may have had. In politics and political economy, we might name, among others, Romilly, Bentham, Ricardo, Bright, Cobden,* Stuart Mill. Though the Government of England is monopolized by the aristocracy, the political thought which governs her governors comes daily more and more from the people. The list of "uneducated" men of science — if I may be allowed the absurdity of such a phrase — is far longer, as, after what has been said, might reasonably be expected, than any the Universities can show, — Davy, Wollaston, Dalton, Faraday, Wheatstone, Delabèche, Murchison,

* In a recently published notice of the lamented statesman whom England has just lost, Professor Goldwin Smith says, "Palmerston has held office almost all his life. Cobden never held an office of any kind; yet the policy of Cobden is prevailing over the policy of Palmerston, as the day prevails over the night."

Hind, South, Fitzroy, Playfair, Carpenter — it might be indefinitely extended; and we shall find that the most eminent of her College-educated men of science are the foremost in denouncing her University system. Of course, all her great engineers, inventors, and builders are uneducated men, — Watt, Telford, Smeaton, Rennie, Brindley, the Brunels, the Stephensons, Sir Joseph Paxton: it is with these names that that sad but glorious volume, "The Pursuit of Knowledge under *Difficulties*," is filled. Her great artists are all "uneducated" men, — Flaxman and Gibson, Landseer, Turner, and Stanfield, Kemble and Macready, and all the rest. And, when we turn to literature itself, the greatest English historical work of this generation — a work on classic history too — was written by an "uneducated" London banker. The greatest, I might almost say the only, English attempt at a philosophy of history, a work which, with all its errors and paradoxes, — and I shall not deny that they are many and great, — is still one which cannot be matched by any similar academic performance, was the work of the "uneducated" son of a London merchant. Her novelists, Dickens, Thackeray, Jerrold, Marryat, come from all quarters save the banks of the Cam and the Isis; not to mention so many of that sex which is excluded altogether from their sacred borders. Bulwer is, indeed, a Cambridge man; but I think Cambridge will be slow to put forward that pretentious charlatan as an example of the fruits of her classical training. Even of her poets, critics, and essayists, what a long list are among the wholly "uneducated," or must be classed among those who derived no benefit from their stay at a University, save that (undoubtedly great) one which comes from mere residence at a place of learning! The names at once occur of Crabbe, Rogers, Lamb, Moore, Montgomery, Hunt, Gifford, Hazlitt, Hood. Who would hesitate to say where Scott's real education lay? Who has criticised the education of Oxford so wittily as Sydney Smith, or so grimly as Carlyle? Wordsworth and Coleridge, in their short stay at the University, owed little or nothing to the studies

of the place. Southey says he only learned to *swim* there — badly; Byron was ruined there; and the beautiful genius of Shelley found there, instead of the help and guidance it so much needed, only cruel and ignominious abuse. Keats, some of whose exquisite poems breathe the very spirit of classical antiquity, was a stable-keeper's son, and never studied at public school or University. England's eminent surgeons and physicians are not University men; and what is it that in that country keeps theology so far behind all other sciences, but the fact that the clergy are the only profession who are *compelled* to subject their minds to the full "dementalizing" power of Oxford training? What power less potent could produce the bigotry of an English High-Church bishop?

I am not forgetful of the eminent names that may be produced on the other side; but, even in regard to these, the question must always be asked, How far was their eminence due to their education? The real relation in which the English schools and Universities stand to her greatest minds, even in the past, and the share which University teaching really had in training them, is a problem that still needs elucidation. "We are not sure," says the present Lord Brougham, writing in 1826, "whether the result of the investigation would be so favorable as is commonly supposed to Oxford and Cambridge. And of this we are sure, that many persons, who, since they have risen to eminence, are perpetually cited as proofs of the beneficial tendency of English education, were at College never mentioned but as idle, frivolous men, fond of desultory reading, and negligent of the studies of the place. It would be indelicate to name the living; but we may venture to speak more particularly of the dead. It is truly curious to observe the use that is made, in such discussions, of names which we acknowledge to be glorious, but in which the Colleges have no reason to glory, — that of Bacon, who reprobated their fundamental constitution; of Dryden, who abjured his Alma Mater, and regretted that he had passed his youth under her care; of Locke, who was censured and expelled; of Milton, whose per-

son was outraged at one University, and whose works were committed to the flames at the other." *

It may perhaps be argued, that many of the "uneducated" men whom I have been enumerating would have been the better for a University training. For a *true* University training, no doubt they would, — one that would have developed all their powers harmoniously, while it gave full play to their special genius. With the advocates of such a training, I have here no controversy: I will even grant that many of these writers, in spite of their genius, betray the faults which are wont to mark the self-educated man. But would it have been better for Mr. Buckle himself, if, by a long course of nonsense-verses, the attempt had been made to flatten and polish him down to the regulation standard of Oxford mediocrity? Mr. Buckle at least stimulates us to think: can as much be said of Oxford bishops?

There is a passage in a recently published book of travels in Russia, by Professor Piazzi Smyth, the Astronomer-Royal for Scotland, which bears on this question, and records a somewhat surprising conclusion. Describing a conversation he had with that eminent astronomer, Struve, as to the results of their experience in University teaching, both agreed that on many points further inquiry was greatly needed; but Professor Struve said, that "this conclusion had been drawn independently by so many differently circumstanced men in the Russian and German-Baltic provinces, from the general impressions which their recollections gave them, that there could be little doubt of its containing much truth, — truth, too, of a startling

* "Edinburgh Review," vol. xliii. p. 339. To this might be added the bitter words of Gibbon, in his Autobiography: "To the University of Oxford I acknowledge no obligation; and she will as cheerfully renounce me for a son as I am willing to disclaim her for a mother. I spent fourteen months at Magdalen College: they proved the fourteen months the most idle and unprofitable of my whole life," — *et seq.* Eton was hardly better in his day than in ours. "A finished scholar may emerge from the head of Westminster or Eton in total ignorance of the business and conversation of English gentlemen in the latter end of the eighteenth century."

character: *the first boys at schools disappear at the Colleges, and those who are first in the Colleges disappear in the world.*" * I am not sure that a similar conclusion would not follow from a similar investigation into our own, as well as into English and German academical history; and that it would not be found, that the men most useful and successful in after-life were not those who had placed themselves most fully under the influence of College training, or been stimulated to exertion by mere hope of College rewards, but those who had been most successful in *escaping* its narrowing influences, while, on the other hand, they had also escaped the still greater dangers of idleness and dissipation in the formative period of their history, — men who had cast from them the trammels of pedantry, and with independent energy marked out their own career. There is a sensible piece of evidence given to our Commissioners by a gentleman who appeared as the father of Eton boys, Mr. Walter, M.P. for Berks. He says: —

"I should not want one of my own sons to get the Newcastle scholarship (the chief prize at Eton), judging from what I have known, from my own observation, of the after-career of men of my own time who obtained it. . . . I think the great object of a public school is to train the greatest amount of average talent which is likely to be useful in English society. You want a strong, healthy race of men, both in mind and body, and not a number of finely grown plants, — not boys, like three-year-old winners of the Derby, — horses who win one race, and then are done for." (Vol. iii. p. 301.)

The useless and unpractical character of English academical education is pointedly illustrated by the evidence of Mr. Chadwick, the eminent social economist, so widely and honorably known in connection with the English Poor Law and Sanitary Commissions. It was given before another Parliamentary Education Committee, — that appointed to consider the subject of competitive examinations in connection with the re-organization of the civil service. These competitive exami-

* Three Cities in Russia, p. 85.

nations may be called the latest English "craze" on the subject of Education. Mr. Chadwick thus comments on them, and it shows very strikingly how much the life has gone out of English academical education: —

"An examination (of candidates for posts in the civil service), mainly on an academical basis, would have excluded from the public service more than one Lord Chancellor and Chief Justice, who began life as young clerks in attorneys' offices. The late Duke of Wellington declared that an academical examination would have excluded him from the army.* It would have excluded Nelson from the navy. . . . My objections have reference, not solely to the time spent in obtaining proficiency in the classics, but also and most to the present mode of treating what are called the pure sciences (the purity of which is at the expense of practicality), and to giving prizes for eminence in the habit of reasoning *from* abstractions, which commonly only conclude *to* abstractions. I would note, as examples of what I mean, eminence in pure geometry, which leaves the landowner incapable of measuring his own lands, or of testing their measurement by others; pure and hypothetical hydraulics, which give him no help in draining his fields, and which, being full of false or inapplicable formulæ, lead, as we have practically found, to great waste and failures; abstract pneumatics, which give no help for the ventilation of buildings he constructs, or the house he inhabits, and which, with abstract acoustics, leave both houses of Parliament in a state of helpless annoyance; finally, mechanics, abstract from the knowledge and consideration of the density of substances, strength of materials, and friction, which leave the accomplished theoretical engineers of the French Colleges, and, indeed, our own military engineers, educated in like manner, to be surpassed by the rude practicality of the most eminent English engineers, whose education began at the wheelbarrow or the workbench. To refer to instances of the practical errors occasioned by the past methods of training in merely abstract reasoning, which are matters of notoriety, the late Superintendent of Machinery at the Woolwich Dockyard was eminent as a calculator; and, being one of the three judges appointed to determine a question between locomotive and stationary engines, for the first railway at Liverpool, he declared, — reasoning upon the habit of abstract mathematics, without reference to the real

* "The great Duke was at Eton a few years afterwards, — a shy, retiring boy, who left the school before he had ever risen into the Fifth Form, and in whom neither masters nor schoolfellows seem to have detected the germ of future greatness." ("*Etoniana*," *in Blackwood's Magazine, March*, 1865.) His older brother, Marquis Wellesley, was a famous writer of Latin verses.

nature of friction, — that, if a locomotive were produced which dragged without cogs, he would undertake to eat the rails and the whole engine. A strictly academical examination would have admitted him, and would most certainly have excluded those who did the work. It would have admitted the gentleman who was, *par excellence*, an instructor in the abstract sciences, and who wrote articles in the Reviews to show the impracticability of steam navigation across the Atlantic; and it would have excluded those who accomplished the feat. It would have admitted those who condemned the screw-propeller 'as being contrary to the abstract law, that action and re-action are equal and contrary;' and it would have excluded those who effected the improvement. It would have included such men as the Astronomer-Royal, who brought before the Institution of Civil Engineers an abstract calculation to prove that the Crystal Palace could not stand; and it would have excluded the gentleman who designed it, and who made it stand, as he had made other buildings stand, and who opened the way to some of the largest structural improvements that have been made in our time. Other instances may be cited as more directly applicable to administration. As, for instance, in relation to finance, it would have included the 'calculating-boy,' and would have excluded a great proportion of the most eminent actuaries, merchants, and Directors of the Bank of England, the East India Company, and other great commercial bodies.

"The present academical education, and the examination attached to it, would, in respect to some branches of administration, give the preference to those geometric and abstract reasoners, who, from narrow premises on the ratio of increase of population to that of production, inferred a state of destitution and crime, as arising from unavoidable necessity, and therefore as unpreventable, and irremediable by any legislation or administration; who inferred from abstract data a continued downward tendency in the face of all the facts of increasing prosperity, and who excited the benevolent to exertions in order to get the country out of an abyss which it was not in, or near getting into. It would have given precedence for the Poor-Law service to a gentleman who could tell me the names of Actæon's hounds, but who could not tell me the names of the chief statutes to be dealt with, and whose education had grounded him neither in the old principles of public policy, nor in law or political economy applicable to them; and it would have excluded a candidate who was pre-eminent in the practical administrative reform, though he had never taken an academical degree. It would have given the preference to those doctors in medicine who have instituted, and against experience have defended, quarantines, over those who have at once proved the uselessness and evils of such measures of precaution, and the efficiency of others.

"Numerous examples might, I apprehend, be adduced to prove, that, for a safe basis even of general examinations, it would be necessary to look to a greatly reformed University examination, or to the proposed

new school of practical science and art, in which professional administration, public as well as private, might hereafter be included." *

I need not apologize for the length at which I have quoted Mr. Chadwick. It is the evidence of an able, practical man, and one of England's greatest benefactors. It does not prove the uselessness of theoretic knowledge, much less any antagonism between true theory and practice: but it exhibits in a striking light the worthlessness of much that passes for higher intellectual training, when put to the test of actual use, and the danger in education of divorcing theory from practice; and is thus a testimony to the soundness of the principle upon which such enterprises as yours are based.

For, gentlemen, if you were to build a mill, and use in its construction all the means and appliances of art, sparing no expense to make it perfect in construction and machinery; if you should then put into it workmen and managers trained expressly to run your machinery; and then, after all had been done for it that wealth and skill could do, you should find, upon setting it in operation, that it worked badly, and that its product, amidst a vast mass of almost worthless material, showed only here and there a perfect article, and that one an article rather fitted for show than use, — you would surely suspect some error in the *principle* on which the mill and machinery were constructed. It is perfect of its kind; no expense has been spared; it has managers who perfectly understand its machinery, — and yet the product is worthless. Clearly there must be some error, not of detail, but of principle, to account for it. Now, this seems to me to be the condition of the great English schools. They have been tried so long, so much pains and cost have been lavished on them, that their failure cannot be accounted for except upon the theory of

* "Parliamentary Report on Civil-Service Examinations." I am indebted for my knowledge of this Report to the admirably indexed and almost complete collection of modern British Parliamentary documents, to be found in that noble Institution, the Free City Library of Boston.

some fundamental error in their organization. And I think this supposition is abundantly corroborated by the evidence which I shall now proceed to mention.

Among the witnesses summoned before them, the Commission adopted the excellent plan of inviting some of the most eminent English men of science to give their views on the general subject of public-school education; and this evidence forms the most valuable and interesting part of the Report. When I mention the names of Lyell, Faraday, the younger Hooker, Owen, Herschel, Max Müller, W. B. Carpenter, and Dr. Acland, as among these witnesses, it will be seen what a value this part of the evidence must possess. It, almost without exception, goes to corroborate the view I have been taking, that the crying evils in English higher education, and the sources of its failure, are *two*, though very closely connected: first, that it utterly neglects the principle, patent to all who will give the least attention to the study of the human mind, that men are born into the world with the most diverse mental aptitudes, requiring, instead of one, a great variety of means for their development, — of means capable of combining, and requiring to be combined in varying ways and proportions, to suit the varying circumstances; and that, therefore, it is simply preposterous to attempt to run all minds in one mould, to fit all to the Procrustes-bed of one narrow system: and, secondly, that the system itself with which the experiment is tried is antiquated and obsolete, in that it utterly ignores the great body of modern physical science, which has come into existence since it was established in the days of Laud and William of Wykeham. So far from considering science worthless as an instrument of mental training, fit only to subserve the plebeian and utilitarian purposes of life, which is the characteristic view taken by the aristocracy who sustain these schools, — a view worthy of an aristocracy which sides with slaveholding assassins in a war waged for republican freedom, — these men of science, — and, gentlemen, they are the *true* aristocracy of England — trace that weakness of

judgment, that want of all reasoning power, which has been betrayed by the liability of these very educated classes to be humbugged by every new charlatanry, such as table-tipping and spirit-rapping and crystal-globe astrologers,* — to the total absence of that mental training which only the inductive philosophy can give. You may be sure that they do not look at science from any such gross pocket-filling point of view; but while unanimously recognizing the claims of language as a factor in education, and doing full justice to the value of the classical languages in particular, they claim its rightful position for science as an equally indispensable element. In fact, the only truly wide and generous views of what really constitutes a liberal education are to be found in the evidence of these men of science, and, to their honor be it said, in that of one or two of the masters of Rugby. A part of this evidence I proceed now to lay before you. I shall select the portions that bear more directly upon the following points: *1st*, As to the diversity of mental characteristics, and the need of variety in methods of teaching and courses of instruction; *2d*, As to the importance of physical science in education, and the practical effect of its omission from the higher English education; *3d*, As to the age at which the teaching of science should be begun, and its true place in the curriculum of liberal study: and I shall call, as my chief witnesses, Professor Faraday, Professor Owen, Professor Carpenter, Dr. Hooker, Sir Charles Lyell, Sir John Herschel, together with the Commissioners themselves, and the few masters in these great schools who are sufficiently free from prejudice to do justice to the subject.†

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* See an article on "Zadkielism," in the "London Reader" for July 4, 1863; and compare Professor Faraday in the volume of Lectures on Education, delivered before the Royal Institution in 1854.

† My extracts from this evidence have extended to such a length, that I have removed them to the Appendix, p. 81, where I ask for them the reader's careful attention, as by far the most valuable part of this pamphlet.

Nothing could well seem more conclusive than this evidence; coming, as it does, from the men of the highest scientific eminence in England. Yet we find the least possible sympathy with such views among the masters of the schools. Certainly they are not all like the Head-masters of Eton and Winchester, whose extraordinary testimony I quoted at the beginning of this discourse; but even the most enlightened of them, the Rev. Dr. Temple, of Rugby, whose communication to the Commissioners, in an able and interesting paper, and who was examined by them at great length, seems to have an exceedingly inadequate idea of the value of scientific study, if we measure it by such evidence as that I have just been quoting, or of the place it is likely to occupy in modern education. The most interesting evidence on this subject, from the public schools, comes from one of his subordinates, the Rev. Charles Evans. In a communication to the Commissioners, in reply to their schedule of printed questions, he writes — and let it be remembered that we have here the result of an extended experience at one of these schools — as follows: —

"It must be remembered, that a large number of boys leave Rugby every year from lower forms; and to most of them, I think, our system does but scant justice. I am not speaking of the idle or the dull, but of a very large class of boys of good natural abilities and industry, who yet do not reach high positions in the school. At about sixteen years of age, this type of mind appears to reach the length of its classical tether; and, however much worked after that time, it takes no polish. Such boys are constantly passed, in the race for promotion, by younger and more apt competitors; and leave school, at seventeen or eighteen years of age, very imperfectly educated, with little Latin and less Greek; with stagnant and ill-informed minds, if not a great disrelish for study and application of all kinds. They have never reached the point at which the study of classics begins to acquire its greatest value as an engine of mental discipline; and, apart from the moral and social advantages and the unconscious self-education of a large school, their last two or three years at Rugby are, I think, almost unprofitable. It is quite true, that, in many instances, such boys grow into eminent men; and we are tempted to confound *post hoc* with *propter hoc*, forgetting how much may be due to natural force of character and abilities, developed in spite of, rather than in consequence of, their early intellectual training.

"To boys of this class, I am strongly of opinion that some modification of our present system would be most valuable. Up to the age of fifteen, upon the average, the staple of instruction ought, I think, to be grammar, taught through the study of the dead languages. Having acquired a solid groundwork in Latin and Greek, they might then be permitted to drop a certain portion of their classical work (say versification and Greek), and devote the time thus gained to *mathematics* principally, — to physical science, history, and modern language; care being taken, of course, to guard against superficial smattering. It does so happen that some such training as this would better meet the immediate wants of several professions and departments in practical life; but I advocate it, not on this narrow ground, but in the abstract, as a valuable liberal education." (Vol. ii. p. 314.)

Mr. Evans feels it incumbent on him to apologize for the accident, that his suggestion is practically valuable; and his plan seems to me to bear the marks of the classical prejudices in which he has been trained. For why should such boys' minds be wearied and schoolmasters be worn out with teaching the rudiments of Greek, when, by his own showing, such teaching will never be put to its highest use? Why cannot modern languages, if properly taught, take the place of Greek, even as a part of the "solid groundwork"?* while they would have the added merit — which, perhaps, is no merit in his view — of being practically useful. And in postponing the teaching of science to so late a period, and in attaching so much more weight to the abstract study of mathematics than to the study of science and history, Mr. Evans shows that he has paid but little attention to the true order of development of the youthful faculties. It seems to me that no reform will fully meet the case, that shall stop short of establishing a course of liberal education, in which linguistic studies shall be

* On the educational value of modern languages, when properly taught, see some good remarks in the "National Review" for November, 1864, p. 296; and a valuable article on the School Claims of Languages, in the "Westminster Review" for October, 1853, by Dr. Hodgson. See also the second series of Professor Max Müller's Lectures on Language. The study of modern languages, considered as a training of the mind, has fallen into undeserved neglect, from the empirical and unsatisfactory manner in which they are usually taught.

represented, first, by a study of the Latin language and literature, *more* thorough and effective than it usually is now, inasmuch as it should be treated as the foundation of a future study of *language* and general grammar, and of a thorough knowledge of the modern languages of the same family; but in which the study of Greek shall be *wholly* superseded by a real study of the mother-tongue and these modern languages; and in which the study of physical science, begun from the earliest moment that the child's observing powers begin to be active, shall be continued in such a thorough manner as shall develop the full disciplinary power it possesses. His picture of the class of young men who derive no benefit from the Rugby system is fully applicable to very large numbers of young men at our own Colleges and high schools; and I do not think our Colleges will gain that full measure of confidence they ought to possess in the public mind, till some such course as this, *begun at school, and accepted for admission to them*, shall be placed upon the same level, in respect to rank and honors, as the exclusively classical course of preparation through which they now insist that all boys' minds shall be driven.*

Experiments have been begun, and are already carried far enough in England, to show that such a course would be successful. The aristocratic spirit of the old institutions we have been examining is so intense, and their course of study so utterly at variance with the wants of modern life, that, excepting by a few pupils who enter on the foundation, they are not frequented by the children of the great English "middle class," with whom the future destinies of the nation are likely to rest. To supply the want of a higher education for them, there have already been established certain large collegiate schools,

* In the case of most, if not all of our American Colleges, while a greater number of Latin and Greek books must be read for admission than are required at a matriculation examination at Oxford or Cambridge, the young men may, and usually do enter, entirely ignorant of the elementary principles of physics or of any branch of natural history.

where the experiment of a modern education is actually undergoing trial. Such are Marlborough, Wellington, and Cheltenham Colleges, brief accounts of which are given in the Appendix to the Commissioners' Report; in all which a "modern school" has been established along-side of, and entirely on an equality with, the classical department, though of course working under great disadvantages, in consequence of the controlling influence of classical tradition and that system of bounties placed upon classical knowledge to which I have already adverted. But, in spite of all discouragements, the scheme seems likely to prove entirely successful. The following extracts are taken from the communications of the Rev. G. G. Bradley, Head-master, and the Rev. J. F. Bright, Master, of the Modern School at Marlborough. Mr. Bradley writes: —

"The object of the modern school is twofold: *1st*, To prepare boys for definite examinations, in which they would not succeed if they competed direct from the classical school; *2d*, To attempt to solve, in some degree, the question often asked, How far is it possible to give a really good public-school education on any other basis than that of instruction in dead languages?

"With regard to the first of these two objects, there can be no doubt as to the result; six candidates from our Modern School have competed at Woolwich the present year. All but one were successful at their first attempt; and scarcely one of them could have succeeded, had they remained in the classical department.

"I imagine, however, that it is the other question which will appear of more importance in the eyes of Her Majesty's Commissioners.

"I do not not believe that we are in a position at present to answer the question finally and decidedly; for the experiment has not yet been fairly tried: but I may state briefly my own opinion. While I should deliberately prefer, as the best education, that mixture of the careful study of the language and substance of the great writers of antiquity with modern reading and mathematics, which I attempt to combine in my own teaching, yet I believe that a thoroughly sound education may be given, and at the same time the advantages of public-school life enjoyed by boys, with whom, for various reasons, a different plan is pursued, a larger space devoted to mathematics and science, and a thorough study of German and French substituted for classics. But the difficulties of working out this experiment are great." (Vol. ii. p. 511.)

Mr. Bradley enumerates, as the chief among these difficulties, the impossibility of finding a sufficient number of teachers as skilful in teaching modern branches, as, through long training, the best classical masters have become in teaching the ancient languages, and the necessity of employing foreigners to teach the modern languages. To this might be added the almost total want of good elementary text-books in science. His conclusion, however, is as follows: "In spite of all the difficulties with which we have had to contend, and of some which we are by degrees overcoming, I am entirely convinced that the general result is most valuable, — so valuable that I should deeply deplore the abandonment, from any cause, of the experiment." And Mr. Bright, the Master of the Modern School, writes as follows: —

"At its first foundation, it was thronged, as might be expected, with boys who desired to avoid the stricter mental training of the classical school, — with the idle, and, in a great degree, by both the rough and unpolished portion of the school; and for a time it acquired a distinct and by no means enviable character. Already, however, in the few years during which it has existed, *this has been entirely obliterated.* The forms are as well organized, the teaching is as regular, and the amount of work done probably as great, as in the classical school. Consequently all marks of difference have disappeared, and the line of demarcation between the two departments is scarcely more pronounced than between any two forms in ordinary circumstances.

"Meanwhile proofs of the usefulness of the institution are constantly given.. Scarcely a half-year passes, but several boys whose intellects were stifled in the uncongenial atmosphere of the classics, and who were consequently rapidly sinking into a state of hopeless or reckless dunce-dom, pass from the Upper to the Modern School; and, finding there room for their peculiar talents, regain their self-esteem, again set cheerfully to work, and gain, with their improved character, a good and sensible education, if not so perfect a one as the classical system offers (?). Nay, more, they not unfrequently attain high positions in the school. For the last two years, the chief mathematical prize has been carried off by Modern-School boys, neither of whom could possibly have succeeded in the classical school; one of whom, indeed, had been tried, and found utterly wanting in that department. . . .

"Whatever success has been reached has been obtained in the face of difficulties above enumerated, and is sufficient to give good ground to hope, that were those difficulties wholly, or in part, removed; were there

the same appliances for modern as for classical teaching; the same well-annotated books; the same carefully arranged grammars; the same accepted curriculum of classical authors, — an education might be given in modern, as accurate as in ancient subjects; while in comprehensiveness, in so far as it would be concerned with the wider field of modern thought, it might even have the advantage." (Vol. ii. p. 513.)

Mr. Barry, Principal of Cheltenham College, says: —

"In the competitive examinations for Woolwich and Sandhurst, the Modern Department has achieved decided and unusual success; and its pupils have afterwards continued to attain distinctions at Woolwich,* Sandhurst,† and Addiscombe.‡ These are its only external tests: perhaps a more valuable one still may be deduced from the fact of its continued numbers and popularity, and from its having attained a complete equality in rank with the Classical Department. . . . I think that its existence gives far greater perfection to the system of education, and far better scope for the various ability and knowledge of our boys, than could be possible if only the classical system prevailed. I feel sure that it gives a true education, and not mere instruction on various subjects." (Vol. ii. p. 548.)

To this may be added the following extract from the communication of the Rev. Dr. Mortimer, Head-master of the City of London School, another great "middle-class" institution, which, opened for the first time in 1837, now numbers six hundred and twenty-six boys: —

"It is my opinion, founded on very considerable experience, that the limited time given to classics, in comparison with other public schools, is fully made up by the increased mental power obtained by an acquaintance with many other subjects. At all events, it is a fact, that the University career of pupils of the City of London School is eminently successful; and the reason seems to be, that, from being early trained to take up several different subjects of study, they acquire the faculty of readily adapting themselves to the work set before them, and bring to it a large amount of collateral information." (Vol. ii. p. 580.)

With these extracts I shall close my long quotations from the Report. The question will be asked, What are the conclusions and recommendations of the Commission, which were

* Royal Military Academy for Artillery and Engineers.

† Royal Military College for Infantry and Cavalry.

‡ East India Company's Military School.

the result of this laborious and careful investigation? I do not think it is too much to say, that the main conclusion is little more than a feeble compromise. Judged of from this distance, it seems to leave almost untouched the chief objectionable features of the system, and simply recommends a supplementing of it by greater efficiency in other departments. How far such recommendations are likely to be carried out by the present heads of the schools, one can judge from the specimens of their views which I have given. Great changes, however, in the constitution of the governing bodies of the institutions are recommended, of the practical effect of which it is difficult or impossible for a stranger to judge; and, though the gross abuse of funds is dealt with with great tenderness, it is evident that it is not to be allowed to continue. That the conclusions of the Commission have been received with some disappointment, seems to me evident from the tone of the British press; though, of course, the Tories and the "Quarterly Review" find every thing as it should be. It is perhaps fortunate for the ultimate success of measures of reform, that more pressing political questions have engrossed the attention of Parliament; and the discussion seems likely to be postponed till a more liberal and progressive set of rulers shall hold the reins of the English Government.

I have thus brought to a conclusion, gentlemen of the Society, this long discussion, — a longer one than I had any idea of entering upon when I began. But I have not feared to trespass on your patience by the multitude of my details, or the length of my extracts; for I trusted that you would think, as I do, that no more important subject can come up for our consideration. I do not hesitate to say, that the final success of our republican institutions will depend, more than upon all else, upon the success of our republican education; that the triumphant evidence we have just been giving of the strength and stability of these institutions is an evidence, more than of all else, of our success, even to the imperfect extent to which it has yet been carried, in *educating the people*. And when war

shall have wholly ceased its alarms, and that vile spirit of caste which began with thanking God that there were no schools in its dominions,* and has ended its foul career in rebellion, treason, and assassination, shall have returned to the pit of darkness from which it rose, no more momentous question will come before our now *wholly* free Republic than the question of the extension of the blessings of our education-system over the whole country, and the making it in all respects what it should be to meet the wants of a free, self-governing people. That that system has been steadily improving during the twenty and more years over which my own observation and experience have extended cannot admit of doubt; but that we have still many lessons to learn before it will approach perfection is a conviction which I believe I share with many who have given thought to the subject. It would be impossible to enter here upon the consideration of the application of the lessons that may be derived from English experience. I must conclude by expressing my conviction, that in your new institution the community will have a school that will be fully prepared to do its share in a real training of the mind of the coming generations.

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* "I thank God, there are no free schools and no printing; and I hope we shall not have these hundred years," were the words of Berkely, the royal Governor of Virginia in 1671. The present condition of that State is a striking commentary on the sentiment.

APPENDIX.

APPENDIX.

I.—Page 13.

The College* of Eton was founded in 1441 by Henry VI. It was intended originally to consist of a Provost and seventy poor-scholars, ten Fellows, ten chaplains, ten clerks, sixteen choristers, one head-master, one lower-master, and thirteen "poor, feeble men." The Provost is the head of the College, and is usually a retired head-master: he takes no part in the instruction. The Fellows are thus defined by one of the present masters, "retired teachers, who have nothing to do with the school beyond preaching a few sermons to a congregation with which they are slightly acquainted; and who only reside occasionally, yet take up a part of the limited space, within the College precinct, and, in addition to an ecclesiastical benefice, draw each one from the College a sum in the shape of dividends which might support ten or twelve exhibitioners." By one of the monstrous abuses universal in connection with English charities, the whole of the additional income derived from the vastly increased value of the school property goes, not to the school, but into the pockets of the entirely useless Provost and Fellows. Thus the annual remuneration of each of the ten Fellows, for doing absolutely nothing, amounts to over four thousand dollars, in addition to an ecclesiastical benefice.

* It should be remembered that the term "College," between which and University, in this country, no very definite line of distinction is drawn, was not originally confined to institutions of learning; but, like its original, *Collegium*, was the title of corporations established for very diverse purposes. In this case the "College" of Eton is seen to have the character partly of a cathedral, partly of a school, and partly of a hospital.

The *net* income of the Provost is returned as twenty-two thousand eight hundred and sixty dollars per annum; and it depends entirely upon his own liberality or sense of justice how much or how little of this he shall devote to the legitimate uses of the College. The Commissioners very mildly report this as a state of things which ought not to continue. What result their suggestions will have, remains to be seen. Lord Brougham attempted a reform nearly fifty years ago, with small success.*

The seventy foundation-scholars or "Collegers," who, among all the eight hundred boys now at Eton, appear to be the only ones who do any serious work, were to be, according to the statutes, "poor and needy, of good character, studiously inclined, and of honest conversation, able to read and sing, and grounded in the elements of grammar;" and their support and education was to be wholly gratuitous. At present, though no money is paid for board or lodging, fees are exacted from them, and they do not come from the class whom the foundation was intended to benefit. The fees exacted, however, are less (about one hundred dollars per annum); and there is a broad line of social distinction between them and the "oppidans" or boarders, from whom they are distinguished by a peculiar dress. They seem really to study, and furnish nearly, if not quite, all the good scholars who go from the school. The sixteen choristers, who serve also in the Chapel of Windsor Castle, are educated at a separate school in Windsor; and the thirteen "feeble men" are now represented by ten almswomen.

The income of the head-master is returned as $22,455, nearly equal to the salary of the President of the United States. It is exceeded, however, by that of the Head-master of Harrow, which is $31,440. The *net* incomes of the Sub-

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* See Reports of the Select Committee on the Education of the Lower Orders, 1818. It was on this occasion, when Dr. Goodall, the Provost, was pleading "usage" for the monstrous and dishonest abuses, that Brougham was heard to mutter, "Usage, indeed! we shall next hear of highwaymen pleading the usage of Hounslow Heath." See an interesting account in the "Edinburgh Review," April, 1861.

masters of Eton, who keep boarding-houses, vary from $3,500 to $8,000.

The annual income from the Eton property is enormous,* and the school has landed estates (a complete list of which is given) in twenty-two of the forty-five counties of England. It has also wholly or partially in its gift forty-seven ecclesiastical benefices, of the annual value of about $73,325. These are chiefly monopolized by the Provost and Fellows.

Winchester and Westminster are, like Eton, Collegiate foundations. The former was founded by the famous William of Wykeham, Bishop of Winchester, in 1387, and is under the government of a Warden and ten Fellows. Besides these, there were originally seventy scholars, a head-master and under-master, three chaplains, three clerks or "singing-men," and sixteen choristers. The constitution has been somewhat changed, and there are now one hundred foundation-boys and twenty "exhibitioners." The foundation-scholars here form a majority, and not, as at Eton, a small minority. The instruction is not wholly gratuitous; but the Warden estimates the advantage at about fifty pounds per annum. The income of the College, in the year 1860, amounted to $88,110. The income of the head-master, from his fees and boarding-house, was $15,000. The average necessary annual expenses of a "Commoner" are set down at $580. There were in 1860 one hundred and ninety-seven boys.

Westminster School was founded in the year 1560 by Queen Elizabeth. It is not a separate foundation, but is controlled by the Dean and Chapter of Westminster. It is situated in the city of London, contained in 1860 one hundred and thirty-six boys, forty of them foundation-scholars; the remainder, in part boarders, and in part day-scholars.

The Charterhouse is not a separate foundation, but is simply a school connected with, and supported from the vast funds of, the celebrated Charterhouse Hospital, founded in London in 1611 by Thomas Sutton. In 1860 it contained one hundred

* No estimate is given in the Report; but the "Edinburgh Review" reckons the total annual income at one hundred thousand dollars, very little of which reaches the scholars for whom it was intended.

and sixteen boys. The average annual income of the Hospital for the past seven years is returned as $113,735.

Merchant Taylors' — another London school — was founded in 1561 by the Merchant Taylors' Company, who expend upon its support between $10,000 and $15,000 annually. It is a day-school, and in 1860 numbered two hundred and sixty boys.

St. Paul's is a London endowed school, with an income of about $50,000, founded in 1511 by Dr. Colet, Dean of St. Paul's, and is under the control of the Mercers' Company. It numbers one hundred and forty boys.

The Grammar-school of Harrow-on-the-Hill was founded in 1571 by John Lyon, yeoman, who left by his will estates and moneys for the support of a school and the maintenance of the highway between Edgeware and London, the latter being a very common subject of bequests, at a time when the public highways of the country were not considered a part of the public charge. Eton and Harrow are the two most aristocratic of the public schools. Harrow seems to stand some degrees above Eton, though below Rugby in efficiency. Though the income of the head-master is so enormous, the school is not richly endowed. In 1860 it numbered four hundred and sixty-four boys. Intended, originally, for the sons of the farmers and tradesmen of Harrow, it has been wholly diverted from that purpose, and turned, like the others, into a great boarding-school for the sons of the aristocracy; the boys for whom it was originally intended forming, under the name of the "English Form," a very insignificant part of it, and having no communication whatever with the boarding-school. The number of boys contained in the latter in 1860 was four hundred and sixty-four.

Rugby, which from comparative obscurity rose to such fame through the labors of the excellent Dr. Arnold, and which is by far the best, as Eton is by far the worst, of these great schools, was founded in the year 1567 by Lawrence Sheriff, citizen and grocer of London. The estates with which he endowed it, chiefly in London, have risen immensely in value, though the income of the school is small, compared with that of Eton. It has averaged for the past seven years $28,265. Though founded originally for the children of the parishes of Rugby and Brownsover, there is not at present in

the school a single child from either. Like the rest, it is a great boarding-school, numbering in 1860 four hundred and sixty-five boys.

Shrewsbury is an old school in the West of England, having been founded in 1551 by King Edward VI. It is celebrated for the accuracy of its classical scholarship, and the great number of "honor-men" it produces; but it has a less fortunate reputation as being pre-eminent for producing scholars who know absolutely nothing but classics. It seems to be in a decaying condition: it has one hundred and thirty-two boys, and an income of about $15,000.*

II. — Page 67.

EXTRACTS FROM EVIDENCE ON THE SUBJECT OF SCIENTIFIC EDUCATION.

From the Evidence of Professor W. B. Carpenter. (Vol. iv. p. 363.)

(Lord Clarendon.) I believe, Dr. Carpenter, you are Registrar of the London University? — I am. How long have you been Registrar? — Six years. I believe you are likewise a member of the Council of the Royal Society? — Yes. . . . Have you been able to form any opinion as to the use of the physical sciences, as a training of the mind, as compared with pure mathematics? — I think that their function is quite different. I think that each is a supplement to the other. I should be very sorry to see either left out. It appears to me, that the use of the physical sciences is to train a class of mental faculties,

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* Whoever wishes for further information respecting these and the other endowed Grammar Schools of England, will find it in "Carlisle's Endowed Grammar Schools," 2 vols., 1818, or the sumptuously illustrated quarto published by Ackermann in 1816. "The Great Schools of England," by Staunton, is a book advertised as now in press in London.

which are ignored, so to speak, by a purely classical or a purely mathematical training, or by both combined. The observation of external phenomena, and the exercise of the reasoning faculties upon such phenomena, are matters altogether left out of the ordinary public-school education. I am speaking of schools in which classics and mathematics are the sole means of mental discipline. Mathematical training is limited to one very special kind of mental action.

In the schools? — I mean, that mathematical training exercises the mind most strenuously in a very narrow groove, so to speak. It starts with axioms which have nothing to do with external phenomena, but which the mind finds in itself; and the whole science of mathematics may be evolved out of the original axioms which the mind finds in itself. I do not go into the question, whether they are intuitive, or whether they are generalizations of phenomena, found at a very early age; in either case, the mind finds it in itself. Now, it is the essence of scientific training, that the mind finds the objects of its study in the external world. As Bacon says, *Homo minister et interpres naturæ;* so it appears to me that a training which leaves out of view the relation of man to external nature is a very defective one, and that the faculties which bring his intelligence into relation with the phenomena of the external world are subjects for education and discipline equally important with the faculties by which he exercises his reason purely upon abstractions.

Then you consider, that the mind, if it only had the training that could be given by close study of classics and of pure mathematics, has not had so great an advantage in training as if the study of physical science had been added? — I am quite of that opinion; and I may add, that, having given considerable attention to the reputed phenomena of mesmerism, electro-biology, spiritualism, &c., I have had occasion to observe, that the *want of scientific habits of mind* is the source of a vast amount of prevalent misconception as to what constitutes adequate proof of the marvels reported by witnesses, neither untruthful nor unintelligent as to ordinary matters. I could name striking instances of such misconception in men of high literary cultivation or high mathematical attainments;

whilst I have met with no one, who had undergone the discipline of an adequate course of scientific study, who has not at once recognized the fallacies in such testimony when they have been pointed out to him.

(Lord Devon.) I observe, Dr. Carpenter, that your matriculation examinations do not take place until the applicant is past sixteen? — Yes.

Being of that age, you see great benefit in making natural philosophy and chemistry part of that examination, in addition to a certain examination in classics; and you consider that not merely as fitting a boy for success in the active business of life, but also as a means of training the mind, and that much benefit results from such combination. I should like to ask you, whether you consider that similar recommendations exist to the introduction of physical sciences at an early age? You applied your observations to your own candidates for matriculation? — I think that there is great advantage in commencing very early. I have commenced with my own children at a very early period in training their observing faculties, simply to recognize and to understand, and to describe correctly what they see, — showing them simple experiments, and desiring them to write down an account of them; and, from my own experience, I should say, that a boy of ten years old is quite capable of understanding a very large proportion of what is here set down under the head of natural philosophy.

(Lord Clarendon.) Is there not a danger of disturbing the power of sustained attention, if too many subjects of instruction are brought before boys at an early age? — I think that very much depends on the manner in which it is done. A good teacher need never forfeit the training of sustained attention by directing the attention to the facts of nature, because the attention is as healthfully exercised in what is going on before the child as it is in the study of a book.

Were you at a public school yourself? — I was not.

You were at a large classical school, were you not? — I was brought up in a private school.

A large school? — About twenty was the average number.

Should you, from your experience as a boy, confirm the opinion you have now expressed? — In the school in which I

was brought up, all these subjects were taught systematically; and I certainly believe, that there was no deficiency there of power of attention, and that the training which was given in classics and mathematics — which was a very substantial one — was not at all impaired by the attention to these other subjects.

At what age did attention to these subjects commence at your school? — I should think that about twelve years might be taken as the average.

Have you any practical acquaintance with the system of our public schools? — Not practically: I know the system generally.

You know the amount of time, perhaps, given to particular subjects, speaking generally? — Yes.

Have you formed any opinion as to whether it would be desirable to diminish the proportion of time given, say to classics or mathematics, for the purpose of introducing physical science? — I have formed an opinion, that at the earlier age, say from ten to twelve or thirteen, the amount of study given to classics may be advantageously diminished. I have been led to conclude, from considerable opportunities of observation, that those who have commenced classics later than usual, and have been of average intelligence, have, by the age of sixteen, acquired as good a classical knowledge as those who have begun earlier, — whose minds have been fixed upon classical study for two or three years longer. I may state, that that is quite the opinion of many gentlemen of very large experience in education; and, I believe, I may quote Professor Pillans, of Edinburgh, as entertaining it. Dr. Hodgson, who had for a long time a large public school in the neighborhood of Manchester, wrote a pamphlet some years ago in defence of that opinion. . . . I could quote several instances of young men who have shown very remarkable proficiency in classical study at the age of sixteen and seventeen, who began very late, — at thirteen and fourteen.

(Lord Devon.) I understand you to attach very high importance to the philosophical study of language? — Yes.

(Lord Clarendon.) And to its being commenced early? — Yes. . . .

(Mr. Twisleton.) I believe you are author of a work called "The Principles of Physiology, General and Comparative"? —Yes.

You are likewise author of a work called "The Microscope and its Revelations"? —Yes.

I believe you are also author of "An Introduction to the study of Foraminifera"? —Yes.

Do you consider that your taste for those studies was awakened at school? —My taste for physical and chemical science was certainly awakened at school. The training that I had in my school-course, and the advantages which I had of attending lectures at the Philosophical Institution at Bristol, at the time that I was going through that course, certainly tended to develop my taste for science generally. At that time, I knew next to nothing of natural history; and I suppose it was the circumstance of my having entered the medical profession, and being led to seek for scientific culture in the subjects on which medicine is founded, that caused me to direct my attention to natural history and physiology, — physiology as based on natural history in fact.

You were likewise instructed in mathematics at school? — Yes.

Had you any occasion to observe at school that there was one class of minds which had a great aptitude for mathematics, another for the physical sciences, and another for the classics; so that there were three different types of mental intelligence? — Yes.

Do you not consider, that it is an injury to a boy who may have a turn for the sciences of observation, or for other natural sciences, that he has no instruction in them whatever up to the time he is eighteen, — up to the time of his going to the University? — I feel that very strongly. I am quite satisfied that there is such a class of minds. I see it in the candidates for our degrees in sciences. Though the degrees have only been instituted two or three years, yet I am quite certain, from what I have seen of those who have become candidates for them, that there is a very decided aptitude for physical sciences; and that those generally are persons who have a distaste for classics. I may say with regard to myself, that I never had

any taste for classics. I went through a very long course of classical training; and I feel very strongly, indeed, the value of the discipline which it gave me: but I never, as a boy, had any taste for classics (though now I can come back and read a classical author with pleasure), because I was weary of the drudgery of the ordinary routine of instruction (to which I had been subjected from an unusually early age), whilst at sixteen my mind was not sufficiently advanced in that direction to appreciate the higher beauties of a classical author. For instance, I could then read the "Prometheus;" but I did not understand its argument.

It would be an injury to the mental capital of a nation, so to say, to give no instruction to boys in the physical sciences up to eighteen? — I should certainly consider that it leaves that branch of the mental faculties, which every individual has in a certain degree, uncultivated, and would leave without cultivation those powers which certain individuals have in a very remarkable degree.

Is it not the case, that there are some boys at school who have only a slight aptitude for classical studies, who have an aptitude for the sciences of observation and the experimental sciences? — I am quite certain of that. I have five sons; and, in their education, I endeavor to train what I perceive to be the special aptitude of each. Thus, my eldest son has shown a decided aptitude for the physical and chemical sciences: he has taken his Bachelor-of-Arts degree in the University, and has now taken that of Bachelor of Science. He took the Bachelor-of-Arts degree because, at that time, there was no degree in science; he went through the classical training required for it, but his whole bent is for the exact sciences. On the other hand, my second son has as strong a turn for literary culture as my eldest son has for scientific; and I have encouraged that just as I would the scientific culture, — taking care, however, in each case, that the other subjects were not neglected.

(Mr. Vaughan.) I think you mentioned that you considered that the study of physical science at an early age was conducive to the cultivation of the intellectual faculties as well as of the senses? — I think so, decidedly, if it is rightly taught. I think very much depends upon the teacher.

Do you think that that kind of cultivation of the intellectual faculties which physical science requires and encourages is such as the man may safely be called upon to go through at an early period of life? — I feel quite sure of it, because it is done to a very large extent in our National schools, and in our British and Foreign schools. I happen to know this from this circumstance: A few years ago, Lord Ashburton requested me to examine for a prize which he at that time gave to the masters of schools in, I think, Hampshire, Wiltshire, and Dorsetshire. I set three or four papers on physical science and its applications, — very much the kind of papers that one would set for the matriculation examination, with as much as possible of practical application to the common affairs of life, to what I think the Dean of Hereford calls "common things," — but requiring a knowledge of principles; and I was extremely surprised at the excellence of the answers which I got. One master, a young man not above twenty years of age, answered every question perfectly well.

Do you think that the mind, ordinarily speaking, is as apt for the exercise of its faculties upon the subjects of natural science as upon grammar and mathematical subjects at the early period of life? — I should say, more so; that it is more easy to fix a child's attention upon something which it sees than upon an abstraction.

Do you think that in that point of view, in fact, it is so far a subject better calculated to call out a healthy action of the reasoning powers than the more abstract subjects of grammar and mathematics? — I think it is at the early period. I think that a lad of from ten to twelve years of age is better fitted to be led to observe and reason upon what he observes in objective phenomena than he is to reason upon abstractions. I think that, from say twelve years of age, the powers may be healthfully exercised upon abstractions; but, as far as I can judge, a child in learning a language learns by rote purely, or almost purely, up to say twelve years of age; but after that he begins, if he is well taught, to understand the *rationale* (so to speak) of the rules; but it is a mere matter of memory with him up to that time.

In fact, you doubt whether, in the cultivation of language,

the reasoning powers are much exercised at all at that time?—Yes. . . .

Have you been sufficiently in company with youths emerging from childhood to say whether there is, in your opinion, at all a natural curiosity which arises at that time for the observation and comprehension of the phenomena of nature?—I should say there is. I have seen a great deal of youths of different ages in the course of my life. I have been always interested in education, and have seen and known a great deal of what takes place in education among the humbler classes; and amongst them there is most decidedly a readiness of observation, and a readiness of power of apprehension and of reasoning upon phenomena of nature, which shows that that must be universal.

Have you observed, that, besides that power, there is a curiosity with regard to the phenomena, and an interest in that sense with regard to the phenomena of the outward world?—I think there is, if it is not repressed. My opinion is, that the tendency of public-school education is to repress all that curiosity,—to withdraw the attention so completely from those subjects that it has no development.

With regard to the study of language, I think you said, that you had had some opportunity of observing that youths who began later could make so much progress, owing to the different state of their faculties then, as that they could recover the amount that had been lost to the study of language by deferring it?—Yes: providing always that their mental habits have been properly trained; that the power of sustained attention, for instance, has been exercised in other ways. . . .

With regard to their bearing on literary studies, do you think that the mixture of the physical sciences with the literary studies would be a mixture which would be conducive of benefit to both, or otherwise?—I think decidedly conducive of benefit, because I cannot think that any mental training can be really adequate which is one-sided; and, again, all experience shows that a change of study from one subject to another is advantageous in this way,—that it is a positive refreshment to the mind. I believe, that a lad who has been exercised a certain number of hours in the study of language, or in the

study of mathematics, would enjoy going to the study of physical science. If it is properly handled, by a good teacher, he would enjoy that as much as he would enjoy going into some desultory course of reading for recreation.

In fact, the exchange would produce very much less physical exhaustion than the continuance of the same study for the same number of hours? — Yes: I feel sure of that. I may mention, that there is at present going on a good deal of inquiry in regard to the number of hours which can be healthfully employed in study by the class of children who attend the National and British schools; and it is a subject in which I have taken a great deal of interest. I have happened to come in contact with a good many individuals who are working out experiments in different ways; and there is a very general conviction amongst the better and more intelligent class of masters in those schools, that four hours a day is as much as can be healthfully employed in purely intellectual acquirements by children of that class. Now, I believe that the allowance which is healthful for children of that class may be, perhaps, double for those of an educated class.

(Lord Clarendon.) At what age? — Say from eight to twelve; but the prevalence of this conviction shows, that the masters, practically, do not find that the children learn more who are at school for six or seven hours than those who are at school only from three and a half to four hours.

(Mr. Vaughan.) Do you think that you would find a different, that is, a larger measure of hours suitable to health, if there was this difference in studies at different times of the day? — Yes: I feel sure of it.

I suppose you say that as a physiologist? . . . Yes; I am speaking as a physiologist decidedly. I am quite satisfied of it as a fact in our mental constitution. . . .

(Sir S. Northcote.) You said just now, that you thought there were instances of boys taking up the study of classics late, and, if they were properly trained in other ways, making up for the lost time by the superiority of their power of application and of learning. Do you think that that might be the case also in the study of physical science, that a boy taking to study physical science late might make up for lost time by beginning

at an age at which his powers were more developed?—I have no doubt that he might make up for lost time: but I think that the natural period for commencing the study of physical science is at an earlier age, because I think any right system of education will take up the faculties in the order of their development; and it is quite certain, that the observing faculties are developed before the reasoning powers. An infant, during the first year of its life, is educating its observing faculties in a way we really scarcely give it credit for; and the training of the observing faculties, by attention to the phenomena of nature, both in physical and in natural science, seems to me to be the natural application of time at the age of say from eight to twelve. . . .

You supported your argument by the case of a boy who had studied French as an introduction to the study of Latin and Greek, and had not suffered in his classical studies by deferring them: would you not think, that a boy would suffer in the study of languages by wholly giving his early years to the study of physical science, and not taking up language at all till he got to the age, say of twelve?—Yes, I think he would. I think that neglecting the study of language altogether would be a very undesirable thing; but what I mean is this: I should prefer to see the faculties which are concerned in the cultivation of physical science trained at the earlier period, because I believe that is the natural period in which the observing faculties and the elementary reasoning processes may be best cultivated, and the period at which the mind is not prepared for the more advanced culture of language.

But is it not the period at which it is also prepared for the commencement of the culture of language?—Certainly; but, then, I think all that the culture of language may give at that period may be given in a smaller number of hours than are usually devoted to it. . . .

(Mr. Twisleton.) A question was asked as to the possibility of a boy, well cultivated in classics, making up afterwards for deficiency in the natural sciences. Would there not be a distinction between the sciences of observation and the sciences of experiment? Is it likely that a grown-up person, or a boy beyond a certain age, would make up for the neglect of the

faculty of observation? — I think not so well. If I am allowed to do so, I may mention my own experience in the matter. My greatest difficulty in the pursuit of systematic zoölogy and botany has arisen, I am quite satisfied, from the circumstance, that I was not early trained in those sciences. I can recognize a flower or an animal when I see them, and I can remember their names. I have no difficulty as to verbal memory; but I have a difficulty in connecting the two things, the flower or the animal and the name; and I believe, that, if I had had an early training in the habit of systematic nomenclature, I should not have experienced that difficulty in later life.

Is it not, to a certain extent, the case with regard to the faculty of observation, as with regard to aptness for rapid calculation in arithmetic, that the habit should be acquired early? — Yes: I am very strongly of that opinion; and I know that it is very easily acquired under proper training. The late Professor Henslow studied the method of teaching natural science, I believe, as carefully as any one; and he was wonderfully successful in training that order of faculties. . . .

Is it the result of your experience, that, by the exclusion of the physical sciences and of the methods of investigation employed in their study, the mind does not receive as good a training as it might do? — I have been acquainted with several gentlemen who have passed with distinction through a course of public school and University training, and who have confessed to me with regret their inaptitude to understand any scientific subject whatever, — their want, not only of the knowledge, but of the mental aptitude.

That is to say, that you consider that the physical sciences and methods of investigation call forth different faculties of the mind from those which are developed by the studies of mathematics and classics? — Yes: I think so very decidedly.

And that, therefore, by neglecting the physical sciences, those faculties lie dormant if they existed? — Yes.

From the Evidence of Sir Charles Lyell. (Vol. IV. p. 370.)

(Lord Clarendon.) I believe, Sir Charles, you are the author of several works on Geology? — Yes.

Also of Travels in America? — Yes.

And you are a Fellow of the Royal Society? — Yes.

I believe you took your degree at Oxford? — Yes.

(Mr. Twisleton.) I believe you took honors at Oxford? — Yes.

And you received a Doctor's degree at Oxford six or seven years ago? — Yes.

(Lord Clarendon.) As we know your attention has long been turned to this subject, I would beg to ask you, as the result of your observation and experience, what you consider to be the position of physical science and natural history in this country, as far as regards our educational system? — I think it is hardly too strong a term to say, that they have been ignored. There has been a move of late in the Universities to restore them somewhat to that place which they formerly held, when the sciences were much less advanced, but when, in proportion to what was then known, they held a very fair position; and within the last two hundred years I consider them to have been deprived of the proper position which they once held. The public schools being modelled in a great measure on the system of the Universities, they have, in like manner, entirely neglected them, even in those schools where they are educated sometimes up to the age of seventeen or eighteen. I think, therefore, that in that period of the progress of the nation, when these branches have been acquiring more and more importance, both theoretically and practically, that has been precisely the time when they have been more and more excluded from the teaching of the higher classes of this country.

To what would you attribute the neglect of these studies that has been shown at the schools in particular? — I think that the schools being preparatory, in a great measure, to the Universities, they frame their system in regard to those subjects which are to obtain the chief rewards, prizes, and honors at the University. Although a large proportion of the boys at our larger schools do not go to the University (I do not know what proportion, but I know that it is very large), nevertheless, the system is planned as if they were all going there; and whatever be the plan adopted at the Universities, and, particularly, whatever may be the matriculation, the entrance examination to the University, that will in no small degree

govern what is taught in public schools, if any branch of knowledge is entirely omitted. . . .

You consider, then, that as there is no demand for physical sciences and natural history at the Universities, there is no attempt to supply them at the schools? — Exactly: that is a great reason. However, it must not be forgotten, that those schoolmasters are brought up in the Universities without a knowledge of the sciences and natural history; and, having no such knowledge, it is very natural that a great number of them should entertain some prejudice, or think very slightingly of them. . . .

You would consider, then, that although the great majority of boys educated at our public schools do not go to the Universities, yet the requirements of those who do go to the Universities do, in fact, regulate the system of the school? — Quite so.

Therefore, you would say, that the majority do not have the education that would be best for them; and, in fact, are sacrificed to the minority who are proceeding to the University? — Yes. . . .

(Lord Clarendon.) Having considered, as you have, this omission of the physical sciences at our schools and Universities as a question of national importance, and a matter of national regret, you must be aware that the excuse is always that there is not time; that the system now pursued at the schools, and afterwards at the Universities, is very much devoted to the study of the classics, and precludes absolutely, from want of time, the study of these other and important sciences. Have you ever considered that question of time, and how these other studies could be joined to the classical studies, without detriment to that which is considered to be the basis of our public-school education? — Yes: I think that a great deal too much time is given to such things as writing Latin and Greek verses, and attempting, even at school, to acquire a degree of proficiency, which would be very useful if a person specialized it afterwards, but which it is not desirable to require of young men before they are eighteen; and that a portion of that which they now acquire at the public schools should be left to be afterwards acquired at the Universities at a later age; and that you should not, at the expense of omitting these

scientific subjects, devote so very large a portion of time to the other departments.

At our public schools, it is generally considered that the study of the classics is the best possible training for the mind; but would you consider that the mind does not get the best possible training, if the study of the physical sciences is omitted? and would you consider that the study of physical science calls into operation and develops faculties of the mind that are not called into activity by classics or mathematics? — Yes: I do most decidedly. I think the reasoning powers and the judgment are more cultivated by these subjects than by the exclusive study of the classics.

Of classics and mathematics? — Yes.

Pure mathematics? — Yes. I think mathematics applied often does that which pure mathematics will not do. . . .

It is sometimes said, with great force, that the faculties of observation ripen, so to say, at an earlier period than the reasoning powers? — Yes.

Do you think that that would or would not point to the conclusion, that such sciences as botany and chemistry, perhaps, and so on, should be communicated at an earlier period? — Yes. I have no children of my own, but I have nephews in whom I take much interest; and I certainly have observed that the powers of observation, and the interest of observing with accuracy, are very early developed, — indeed, at nine or ten; and they learn a vast deal of other things in consequence, if they be taught any of these branches. . . . You would prefer their beginning at an early period? — Yes, indeed, I should. . . . (Mr. Vaughan.) Do you think that purely literary pursuits, and the literature of the country generally, would receive benefit by a degree of scientific education and instruction being given in the public schools and the Universities in conjunction with a literary education? — Indeed, I think it would. I think the literature would gain. I think the literary writings of a man like Hallam, for instance, who had taught himself science and natural history, are of a higher stamp than they would have been if he had not had that knowledge. . . .

In your geological investigations in Germany, have you become acquainted with many literary men there? — Yes.

Among the class of literary men, is there greater or less knowledge of the physical sciences than in England?—There is decidedly more general knowledge, even where there is no special knowledge. They understand a great deal more what we are about than the literary men and classical scholars of this country do. . . .

Have you ever had conversations with men in the small towns who have information which you would not be likely to find in England?—Quite so. I may mention Winchester as an instance that I have had practical experience of. I have been very much struck with it. If you were to go, in Germany, to a second-rate school,—I mean a town of second-rate importance,—and go to a gymnasium there, you would get information on scientific points that it would be quite in vain to look for in such a magnificently endowed establishment as Winchester. . . .

(Mr. Thompson.) With regard to the clergy, have you seen any thing of the clergy in Germany? Would you say that they were better acquainted with such subjects?—Yes, indeed, I think they are. I think there is a great advantage in that respect in Germany. In fact, it was an observation of Baron Von Buch, when he came over here, "In regard to Church matters, or the connection of science and religion, you are as much behind us in freedom, as you are ahead of us in your political institutions;" and I attribute that, in some measure, to there being a better general notion of science among the clergy. . . .

(Mr. Twisleton.) Is it the case, that, in some practical departments of knowledge, say in your own, there is a difficulty of obtaining the assistance of educated men for important practical purposes?—Yes: until the formation of the School of Mines in Jermyn Street, which is quite a new establishment, it is extraordinary the difficulty there was. If they sent over from the Colonies for some one to make a geological survey, or to examine into the mines, or if a man like Lord Breadalbane offered to give £700 or £800 a year to any one who would survey his estate, there was no well-educated man to be found in England: our only chance in that case was Scotland. Although the mining wealth of this country is very superior to that of any other, or almost all the others put together, such

was the neglect of scientific education, in that sense, that we had sometimes to send over to Germany to supply a surveyor. . . I think that you would have a greater number of well-educated men who would go into these departments, if the elements of science were not wholly neglected at the great schools. . . .

Which would you like best to see in public schools, — a system of teaching both literature and physical science carried throughout the school, and made universal, or a system of what is known abroad by the term of "bifurcation;" by which I understand it is meant, that, when boys come to a certain point, they should choose whether they would pursue the literary or the scientific branches of education? — At what age is that? — (Mr. Twisleton.) They leave at eighteen. — (Sir S. Northcote.) Fifteen or sixteen, I think; say sixteen. — I have not fully considered that point. At the same time, having thought over the very great range of subjects, and the very different turn of boys' minds, and the different aptitudes they have by nature, I have always been in favor of their being allowed to select as soon as possible after they have once secured the general groundwork. . . .

(Mr. Vaughan.) Have you any means of knowing whether, in the middle classes, there is a greater knowledge on these subjects at present than in the upper classes? — It is a very remarkable fact, that, if a scientific book is published, it depends more for its sale on the middle classes of the manufacturing districts than on the rich country gentlemen and clergy of the agricultural parts of the country; and therefore, if there is distress, like the present in Lancashire, the publisher would say, "Do not bring out your book now."

In a political point of view, is not that not only an unhealthy, but a dangerous state of things, in some respects, that the material world should be very much better known by the middle classes of society than by the upper classes? — Certainly; and I think it is particularly so in reference to the teaching in this country by the clergy; and a vast proportion of the University men are going into the Church. . . .

(Sir S. Northcote.) But if the upper classes, in acquiring a greater amount of this knowledge of the physical world, were to lose any of their literary and intellectual superiority, might

they not thereby endanger their pre-eminence as much in the one way as they would gain in the other?—In answer to that question, I think I could say, from my own experience, that, in consequence of narrowing the number of subjects taught, a large portion of those who have not a particular aptitude for literary pursuits, but who would have shown a strong taste for the sciences, are forced into one line; and, after they leave their College, they neglect branches they have been taught, and so cultivate neither the one nor the other. I have known men, quite late in life, who have forgotten all the Latin and Greek which they spent their early years in acquiring, hit upon geology or some other branch, and all at once their energies have been awakened, and you have been astonished to see how they came out. They would have taken that line long before, and done good work in it, had they been taught the elements of it at school.

(Mr. Twisleton.) So that there was a mental waste in their youth?—Quite so.

From the Evidence of Professor Faraday. (Vol. iv. p. 375.)

(Lord Clarendon.) I believe you were at one time Instructor for the Government at Woolwich: were you not?—I was.

For how long?—For twenty years. I was Professor of Chemistry there; or Lecturer on Chemistry, I should rather say, because the Professorship passed away with McCulloch, and was not renewed until I left. I am also one of the Senate of the London University,—one of the original nominees.

I believe you have been in the habit of lecturing at the Royal Institution?—I have.

For how many years?—For a good many years. I cannot tell how many. And you have also been in the habit of giving juvenile lectures?—I have. Will you have the goodness to give us your opinion, as the result of your observation and experience, upon the state of knowledge of the physical sciences and natural history in this country with reference to our educational system?—I can give you my impression, as far as that is permissible, independent of any comparison between that part of knowledge and other branches. I am not

an educated man, according to the usual phraseology, and therefore can make no comparison between languages and natural knowledge, except as regards the utility of language in conveying thoughts; but that the natural knowledge which has been given to the world in such abundance during the last fifty years should remain, I may say, untouched, and that no sufficient attempt should be made to convey it to the young mind, growing up and obtaining its first views of these things, is to me a matter so strange that I find it difficult to understand it. Though I think I see the opposition breaking away, it is yet a very hard one to overcome. That it ought to be overcome, I have not the least doubt in the world. . . .

(Lord Clarendon.) You probably are aware that what our great schools profess and aim at most, is to give a good training to the mind; and it is there considered, perhaps, as you were saying just now, from habit and from prestige, that that is effectually done by the study of the classics and of pure mathematics, and that in that way they furnish the best training of the mind that can be given. Now, I would ask you, whether you think, supposing the training of the mind is the object in the public schools, that that system of training the mind is complete which excludes physical science? whether the study of physical science would call into activity faculties of the mind that are not so developed by studies confined to classics and mathematics? — The phrase, "training of the mind," has to me a very indefinite meaning. I would like a profound scholar to indicate to me what he means by "training of the mind;" in a literary sense, including mathematics. What is their effect on the mind? What is the kind of result that is called the "training of the mind"? Or what does the mind learn by that training? It learns things, I have no doubt. By the very act of study, it learns to be attentive, to be persevering, to be logical according to the word "logic." But does it learn that training of the mind which enables a man to give a reason, in natural things, for an effect which happens from certain causes, or why in any emergency or event he does or should do this, that, or the other? It does not suggest the least thing in these matters. It is the highly educated man that we find coming to us, again and again, and asking the most simple

questions in chemistry and mechanics; and when we speak of such things as the conservation of force, the permanency of matter, and the unchangeability of the laws of nature, they are far from comprehending them, though they have relation to us in every action of our lives. Many of these instructed persons are as far from having the power of judging of these things as if their minds had never been trained.

You would not consider that the minds of such men as you allude to, who have been highly trained, and who have great literary proficiency, are in a state readily to receive such information as they are deficient in? — I find them greatly deficient; not in their own studies, or in their applications of them, but when taken out of that into natural sciences. Ask what is the reason of this or that, — they have a difficulty in giving the reason. If they are called upon to judge in a case of natural science, they find it difficult to give a judgment; they have not studied it.

You do not find any particular aptitude in those minds for grasping a new subject? — I do not. Take those minds, and apply them to the special subjects which they have never touched upon or known of, and they have to go to the beginning, just as the juvenile does. They are no more ready. The young mind, as I find it, formed by habits, forced this way and that way, is very observant, and asks most acute questions. I do not find that mind, generally speaking, backward in understanding the statement I make to him in simple language; and if I tell him this or that, — if I tell him that the atmosphere is compounded of oxygen, nitrogen, and so on, and then shape it into a question, — he can generally answer me. I must confess to you, that I find the grown-up minds coming back to me with the same questions over and over again. They ask, What is water composed of? though I have told the same persons, a dozen years in succession, that it is composed of oxygen and hydrogen. Their minds are not prepared to receive or to embody these notions; and that is where you want education, — to teach them the A B C of these things.

You think that exclusive attention to one set of studies during early life rather precludes the ready adoption of these ideas? — Yes. It does not blunt the mind, — I do not think it

does,—but it so far gives the growing mind a certain habit, a certain desire and willingness to accept general ideas of a literary kind, and to say all the rest is nonsense, and belongs to the artisan, that it is not prepared to accept, and does not accept, the other and greater knowledge.

So that the mind runs in a particular groove, from which it does not extract itself easily?—Yes: by that degree of habit, the mind, I do think, is really injured for the reception of other knowledge. . . . Supposing the one main object of education to be to train the mind to ascertain the sequence of a particular conclusion from certain premises; to detect a fallacy; to correct undue generalization; or generally to prevent the growth of mistakes in reasoning,—should you consider physical science is as valuable for that object as classical instruction is?—I do not see clearly how classical studies do educate the mind for that kind of judgment; but, as regards the exercise of the judgment on the laws of matter, it is to me the most fertile source of the exercise of that judgment, and the true logic of facts, which I can conceive of, and which enables the man, when he has the facts in his hand, to apply them in every form and shape. . . . I think I see a most lamentable deficiency, even in the highly educated men, of that kind of logic. . . . I hope I shall offend nobody if I try to illustrate my feeling in that respect. Up to this very day, there come to me persons of good education, men and women, quite fit for all that you expect from education: they come to me, and they talk to me about things that belong to natural science; about mesmerism, table-turning, flying through the air; about the laws of gravity; they come to me to ask me questions; and they insist against me, who think I know a little of these laws, that I am wrong and they are right, in a manner which shows how little the ordinary course of education has taught such minds. Let them study natural things, and they will get a very different idea from that which they have obtained from that education. It happens up to this day. I do not wonder at those who have not been educated at all; but such as I refer to, say to me, "I have felt it, and done it, and seen it; and, though I have not flown through the air, I believe it." Persons who have been fully educated, according to the present system, come with the same propositions as the untaught, and stronger ones,

because they have a stronger conviction that they are right. They are ignorant of their ignorance at the end of all that education. It happens even with men who are excellent mathematicians. They and you will say, "But you are most likely wrong, and they right." It may be so; at all events the education we speak of in natural things will be something in addition to that which they gain by their study of the classics. Until they know what are the laws of nature, and until they are taught by education to see what are the natural facts, they cannot clear their minds of these, as I say, most absurd inconsistencies; and I say again, as I said once before, that the system of education that could leave the mental condition of the public body in the state in which this subject has found it, must have been greatly deficient in some very important principle.

(Lord Lyttleton.) When you say that you have not been able to understand in what way classical instruction trains the mind, you are aware that many, perhaps most, of the defenders of classical education defend it on the ground, not that it teaches certain things, nor that the classics as classics have any peculiar value; but that, through the classics, both the laws of language and the structure of language are studied; and that it is the study of the laws of language which is held best to develop and strengthen the mental faculties?—That is narrowing the question this way, that, in place of saying you are taking the classics, you take the laws of language; and no doubt they give that education, as far as I can see. I am reasoning in the dark, because I have not had the opportunity, and have not the right, to speak of these things. I confess all that; but although it be a very important thing to know language perfectly, and to know its laws, or to carry it out, as the most profound scholar would do, by tracing all languages to an original one, or what not,—Max Müller or anybody else,—that is not all knowledge. I am not attacking the classics at all. I am only putting in a plea for that other knowledge which belongs to our absolute nature, and in fact which language only helps to describe.

What is held, I believe, by the defenders of classical literature is, that the study of language strengthens the general

powers of the mind in its application to any other subjects whatever which may come before it, and that in that way the mind is best strengthened as an instrument for acquiring any other kind of knowledge whatever? — I see the value of those studies which do lead to such a result; but I think, that, at present, society at large is almost ignorant of the like and greater value of the kind of studies which I recommend. . . . I say, that these physical sciences, in my opinion, ought to be brought forward also; and I say it the more boldly, because the learned men who have been so educated in languages do *not* show any aptness to judge of physical science. In matters of natural knowledge, and all the uses and applications derived from it, I should turn to a man, untaught in other respects, who I knew was acquainted with these subjects, rather than to a classical scholar, as expecting to find within his range that mode of mind, or that management of the mind, which would enable him to speak with understanding. Any word that I have said that has led you to think that I am opposed to classics, I must withdraw. I have no such feeling.

From the Evidence of Professor Owen. (Vol. iv. p. 387.)

The result of your observation, coming in communication, as you must have done, with various classes, — the wealthy, the middle, and the poor, — I suppose is, that there exists a complete deficiency in knowledge of physical science and natural history? — The absence of a knowledge of the main end, methods, and application of natural history has appeared to me to be greater in the higher and more refined classes of the community, than in the middle or perhaps even, as regards details or species, than in the lower classes. If I were to select a particular group, it would be the governing and legislative class; which, from the opportunities I have had of hearing remarks in conversation or debate, appears to be least aware of the extent of the many departments of natural-history science, of the import of its generalizations, and especially of its use in disciplining the mind, irrespective of its immediate object of making known the different kinds of animals, plants, or minerals.

I suppose, when you attribute this state of ignorance to the higher classes, you allude to the absence of instruction, both at the public schools and the Universities, at which these classes, in particular, are educated? — More especially at the public schools. . . .

I suppose you would consider that is not the best training which omits the physical sciences? — Not the completest. Grammar and classics, arithmetic and geometry, may be the most important disciplinary studies. We know the faculties of the mind they are chiefly calculated to educe; but they fail in bringing out those which natural-history science more especially tends to improve. I allude now to the faculty of accurate observation, of the classification of facts, of the co-ordination of classes or groups; the management of topics, for example, in their various orders of importance in the mind, giving to a writer or public speaker improved powers of classifying all kinds of subjects. Natural history is essentially a classifying science. Order and method are the faculties which the elements and principles of the science are best adapted to improve and educe. . . . In every community of two hundred or more youths, there must be some few, the constitution of whose minds is specially adapted to the study of natural history, to the work of observation and classification, who consequently are impelled by innate aptitude to that kind of study, but who are not at present afforded the slightest opportunity of working their minds in that way; so that it may happen that the faculty or gift for natural history, if it be not actually destroyed by exclusive exercise in uncongenial studies, is never educed. What is the result? In all our great natural-history movements, we have looked in vain, since the death of Sir Joseph Banks, for any man having a sufficient standing in the country to fraternize with us, to understand us, to help us in debate or council in questions most vital to the interests of natural history. It has often occurred to me to ask how such should be the case; and my answer has been, that, in the education of noblemen and gentlemen, the great landed proprietors of England, of those destined to take part in the legislation and government of the country, there has been a complete absence of a systematic imparting of the elements of natural history; no

demonstrations of the nature and properties of plants and animals; no indication of the aims and importance of natural history; no training of the faculties, for which it affords the healthiest exercise: consequently they have not been educed. I cannot doubt that this must have been the effect of the present restricted system. There must have been by nature many Sir Joseph Banks's since he died: but they have been born, have grown up, and passed away without working out their destined purpose; their peculiar talent has never been educed; their attention has never been turned to those studies: but they have been wholly devoted to classics. It must be remembered, that minds of this class are usually very averse to classical studies, and mere exercises of memory and composition: they never take to them; they get through them as well or as ill as they can, doing little or nothing to the purpose; and they fail to achieve that for which they are naturally fitted, from the want of having their special faculties educed. I consider it a loss to the nation, that, in our great educational establishments for youth, there should be no arrangements for giving them the chance of knowing something of the laws of the living world, and how they are to be studied. . . .

Do you think there would be much difficulty in getting teachers, say for the seven or eight principal schools of the country, to undertake that work? — I am afraid at the present time that there would be, arising from the general defects of our teaching arrangements, especially the want of systematic teaching of the elements of natural history in schools. We are all of us, as it were, naturalists by accident. It is the perception of that difficulty which has led me, on every occasion when I have been called upon to give evidence on the subject, to urge the giving of elementary instruction in natural history as one of the duties that should be attached to the keeper of each secondary or subordinate department in great national museums of natural history. . . .

Do you consider that there exist at present good elementary works, on which a teacher might rely for assistance? — No: it would be very difficult to select one to answer that purpose; the demand has not arisen, and therefore there is not the supply.

It would not be difficult to write one? — More difficult than is generally thought. Good elementary books on science are very rare.

In Germany do you know any good elementary books, or in France? — Yes: they have good elementary books in both countries. In France there is an excellent elementary work on Zoölogy, by Professor Milne Edwards.* . . .

Have you observed at school and in life since, that there are three distinct types of mind, that some boys have a predominant turn for languages, others for mathematics, and others for the sciences of observation, and other natural sciences? — These are the three principal distinctions that one observes in all schools, no doubt.

Taking a school like Eton, where there are eight hundred boys altogether, can you entertain any doubt that there are many boys at that school whose predominant type of mind is for the study of natural science? — I have no doubt of it; and I have had complaints uttered to me by gentlemen who have been educated at Eton, and have afterwards, under consequent disadvantage and difficulty, followed their own bias in favor of the natural sciences, and who have regretted deeply that they never had an opportunity of learning the elementary principles of natural history.

Do you not think it is a great hardship to some boys, that they have to remain at school perhaps till eighteen years of age, without receiving any instruction on these subjects, for which they have a natural aptitude? — I think it not only a hardship, but an injury.

(Mr. Thompson.) You say that many of those sciences are in a progressive state? — Every science we are acquainted with is one of progress.

But the principles of some of the sciences are determined; such as those of mathematics, for instance? — The fundamental principles of classification in natural history are as certain.

Take this case: fifty years ago, supposing zoölogy to have been taught in schools, would not the Linnæan system have been adopted? — You might teach the main part of that system,

* Translated by Knox, 2d ed., London, 1864.

in reference to botany, as a disciplinary science at the present day.

I was thinking of the study of zoölogy? — In zoölogy, although of course there has been a great increase in the knowledge of the structure of animals since the time of Linnæus, still the principles laid down in Linnæus's immortal work, "Philosophia Botanica," are really those that cannot be deviated from, whether the elements of zoölogy or botany be imparted.

You do not think there is any objection to the educational use of the physical sciences in consequence of the fluctuating or speculative character of those sciences? — I deny the "fluctuating character:" it is not applicable to natural history. The zoölogical system of Ray is the basis of the system of Linnæus. It forms an essential part of the Linnæan system. There is neither fluctuation nor speculation. The principles of natural history are already as settled and fixed as can be needed for its use as a disciplinary science. Modification of details would never affect its value in relation to elementary teaching.

The zoölogical classifications of the ancients were somewhat puerile, were they not, even the classification of Aristotle? — No: it is surprising how much of Aristotle's system is really retained; how much is founded on truth, and is the basis of the modern classification.

Plato was the first writer on classification, I think: Aristotle is very severe on him, if I remember rightly? — I am not sure. But the improvement that Cuvier made on the zoölogical system of Linnæus was mainly a revival of the Aristotelian principles, because Cuvier was the first modern systematist who had any thing like the same amount of knowledge of the structure of animals which that wonderful man, Aristotle, possessed.

(Mr. Vaughan.) I suppose that, in reference to the point on which Professor Thompson has just been speaking, it is the case in all but the most abstract sciences, in all branches of human knowledge, that there is some change of a progressive nature in the truths that are enunciated? — The amount of change, as affecting the great body of the doctrines, of course varies with the state of our knowledge.

I suppose that, if we were to wait in order to teach the subject until we entirely escaped the possibility of there being some change in the form and substance of the truths taught, we should have to wait for ever in all sciences: should we not? — We should certainly have to wait for the termination of our existence as a species.

(Mr. Thompson.) Not with respect to arithmetic, for instance? — In Transactions of Societies and Academies of the Natural Sciences, we see annual progress and discoveries in mathematics; the sciences, in regard to the works of nature or of the Author of nature, are more incomplete; and the more we know of them, the more we get impressed with the small amount of knowledge we possess. But that amount, compared with ignorance, is so great, and the principles that we are enabled to educe from the little that we do know are so sure, that, taking them at the present very imperfect standard, whether in respect to zoölogy or botany or geology, they are as good for the purposes of elementary instruction and discipline as they will perhaps be ten thousand years hence.

There is another point upon which I should like to have your opinion, which is a practical matter entirely, with reference to natural history and philosophy. Has it occurred to you to observe, whether persons in the upper classes of society, and other members of society, are well or ill acquainted with the physiological laws of the human structure? — No: it is a knowledge very rarely possessed, as far as my experience goes, very rarely indeed; and I believe that it is chiefly upon that general ignorance that the success of spurious systems of medicine have their dependence. It is upon the general ignorance of the population that the empiric bases his pretensions, and has an influence for a certain time, till one subsides, and is succeeded by another. . . . In reference to the conclusion to which I have come in regard to the importance of natural history as an element of school instruction, and the time to be given to it in beginning the experiment, I would ask leave to read a passage from the address of a gentleman who fills a very eminent position, — that of Local Director of the Geological Survey of Ireland, and Lecturer on Geology to the Museum of Irish Industry, Mr. J. B. Jukes; who, in opening the business of the

Geological Section of the British Association, over which he presided at Cambridge, made these remarks: "The natural sciences are now considered as worthy of study by those who have a taste for them, both in themselves and as a means of mental training and discipline. In my time, however, no other branches of learning were recognized than classics and mathematics; and I have, with some shame, to confess, that I displayed but a truant disposition with respect to them, and too often hurried from the tutor's lecture-room to the river or field to enable me to add much to the scanty store of knowledge I had brought up with me. Had it not been then for the teaching of Professor Sedgwick in geology, my time would have been altogether wasted." So that it was just the accident, so to speak, of one short course on a branch of natural history, grafted through an old bequest upon the main studies of his University, that led Professor Jukes to his appreciation of the method of study and value of the science which owes so much to his labors. I could also, with your permission, adduce a higher authority on the main point, and that is Baron Cuvier's; who, in the preface to the first edition of his elementary book on Natural History, expresses himself as follows: "The habit, necessarily acquired in the study of natural history, of mentally classifying a great number of ideas, is one of the advantages of this science which is seldom spoken of, and which, when it shall have been generally introduced into the system of common education, will perhaps become the principal one: it exercises the student in that part of logic which is termed 'method,' as the study of geometry does in that which is called 'syllogism;' because natural history is the science which requires the most precise methods, as geometry is that which demands the most rigorous reasoning. Now, this art of method, when once well acquired, may be applied with infinite advantage to studies the most foreign to natural history. Every discussion which supposes a classification of facts, every research which requires a distribution of matters, is performed after the same manner; and he who has cultivated this science merely for amusement, is surprised at the facilities it affords for disentangling all kinds of affairs. It is not less useful in solitude; sufficiently extensive to satisfy the most powerful

mind; sufficiently various and interesting to calm the most agitated soul: it consoles the unhappy, and tends to allay enmity and hatred. Once elevated to the contemplation of the harmony of nature, irresistibly regulated by Providence, how weak and trivial appear those causes which it has been pleased to leave dependent upon the will of man! How astonishing to behold so many fine minds consuming themselves so uselessly for their own happiness and that of others, in the pursuit of vain combinations, the very traces of which a few years suffice to obliterate! I avow it proudly, these ideas have always been present to my mind, the companions of my labors; and if I have endeavored, by every means in my power, to advance this peaceful study, it is because, in my opinion, it is more capable than any other of supplying that want of occupation which has so largely contributed to the troubles of our age."

From the Evidence of Dr. J. Hooker. (Vol. iv. p. 382.)

(Lord Clarendon.) I believe you are a Fellow of the Royal Society? — Yes.

And Assistant-Director of the Botanical Gardens at Kew? — Yes.

You are the author of "Travels in the Himalaya"? — Yes.

From your experience, and the means of observation you have had, have you formed any opinion as to the state of knowledge in natural and physical science, with respect to the education of the upper and middle classes, as it exists at present? — At Kew, we are thrown into contact with persons belonging to the middle and upper classes in very large numbers; and I think the regret that they knew nothing of botany is quite apparent in all their communications with us. Hardly a day passes but what we receive communications from some part of the world in which such regret is expressed.

What is the nature of the communications into which you are brought with these classes at Kew? — Most prominently now with regard to vegetable fibres. Sometimes two or three letters a day come to us requiring information with regard to well-known fibres, which the slightest habit of observation, or

the slightest knowledge, would assure the persons who send them that they cannot, in any way, be used for cotton.

Then these have been comparatively recent communications? — No: they have gone on for the last twenty years of my father's experience, and the last ten years of my own; not so much formerly with regard to cotton fibre for the use of yarns as for making paper, and for many other purposes to which cotton is applied.

In fact, you say, that the upper and middle classes in this country are in the habit of constantly consulting either your father or yourself at Kew? — Yes, both officially and unofficially.

And both the subjects upon which they wish to have knowledge, and their mode of inquiry, lead you to think that they are in a state of great ignorance? — Yes.

That that study in particular has been greatly neglected by those classes? — Very greatly.

And they have generally expressed their regret that it has been so neglected? — Universally, I may say.

You have probably considered that the neglect of this important study is a matter of national regret? — I have always thought so.

Have you ever turned your attention at all to the possibility of teaching botany to boys in classes at school? — I have thought that it might be done very easily; that this deficiency might be easily remedied.

What are your ideas on the subject? — My own ideas are chiefly drawn from the experience of my father-in-law, the late Professor Henslow, Professor of Botany at Cambridge. He introduced botany into one of the lowest possible class of schools, — that of village laborers' children in a remote part of Suffolk.

Perhaps you will have the goodness to tell us the system he pursued? — It was an entirely voluntary system. He offered to enroll the school children in a class to be taught botany once a week. The number of children in the class was limited, I think, to forty-two. As his parish contained only one thousand inhabitants, there never were, I suppose, the full forty-two children in the class; their ages varied from about eight years old

to about fourteen or fifteen. The class mostly consisted of girls. . . . He required, that, before they were enrolled in the class, they should be able to spell a few elementary botanical terms, including some of the most difficult to spell, and those that were the most essential to begin with. Those who brought proof that they could do this were put into the third class; then they were taught once a week, by himself generally, for an hour or an hour and a half, sometimes for two hours (for they were exceedingly fond of it).

Did he use to take them out in the country, or was it simply lessons in the school? — He left them to collect for themselves; but he visited his parish daily, when the children used to come up to him, and bring the plants they had collected; so that the lessons went on all the week round. There was only one day in the week on which definite instruction was given to the class; but on Sunday afternoon he used to allow the senior class, and those who got marks at the examinations, to attend at his house. . . .

Did he find any difficulty in teaching this subject in class? — None whatever; less than he would have had in dealing with almost any other subject.

Do you know in what way he taught it? did he illustrate it? — Invariably: he made it practical. He made it an objective study. The children were taught to know the plants, and to pull them to pieces; to give their proper names to the parts; to indicate the relations of the parts to one another; and to find out the relation of one plant to another by the knowledge thus obtained.

They were children, you say, generally from eight to twelve? — Yes, and up to fourteen.

And they learnt it readily? — Readily and voluntarily, entirely.

And were interested in it? — Extremely interested in it. They were exceedingly fond of it.

Do you happen to know whether Professor Henslow thought that the study of botany developed the faculties of the mind, — that it taught these children to think? and do you know whether he perceived any improvement in their mental faculties from that? — Yes: he used to think it was the most

important agent that could be employed for cultivating their faculties of observation, and for strengthening their reasoning powers.

He really thought that he had arrived at a practical result? — Undoubtedly; and so did every one who visited the school or the parish.

They were children of quite the lower class? — The laboring agricultural class.

And in other branches receiving the most elementary instruction? — Yes.

And Professor Henslow thought that their minds were more developed; that they were become more reasoning beings, from having this study superadded to the others? — Most decidedly. It was also the opinion of some of the inspectors of schools, who came to visit him, that such children were in general more intelligent than those of other parishes; and they attributed the difference to their observant and reasoning faculties being thus developed. . . .

So that the intellectual success of this objective study was beyond question? — Beyond question. . . . In conducting the examinations of medical men for the army, which I have now conducted for several years, and those for the East-India Company's service, which I have conducted for, I think, seven years, the questions which I am in the habit of putting, and which are *not* answered by the majority of the candidates, are what would have been answered by the children in Professor Henslow's village school. I believe the chief reason to be, that these students' observing faculties, as children, had never been trained, — such faculties having lain dormant with those who naturally possessed them in a high degree; and having never been developed, by training, in those who possessed them in a low degree. In most medical schools, the whole sum and substance of botanical science is crammed into a few weeks of lectures, and the men leave the class without having acquired an accurate knowledge of the merest elements of the science. . . .

At the High School in Glasgow, did you observe among the boys a difference of aptitude for the three branches of languages, mathematics, and the sciences of observation? — Very great.

A boy who distinguishes himself in classics might have an inaptitude for mathematics and natural science, and *vice versa?* — Yes. One of my own classmates was a dull boy in the High School, where mathematics were not then taught, except in the senior class, which I did not attend. He was the best mathematician of his year at the University afterwards.

Do you not think that it is very undesirable that a boy at school, having faculties of a particular kind, should have them wholly neglected? Take the example of a boy who has really an aptitude for the natural sciences, do you not think it a very hard case that his faculties should be wholly neglected? — I think it is very hard. Nothing is more destructive to his whole education.

Supposing that a boy happened not to have a turn for languages, his place in school would be very low down. Would it not have an injurious moral effect habitually for him to be regarded as stupid, because he had no talent for languages? — Yes.

It would have a tendency to impair his self-respect? — Yes.

The same boy, if he had an opportunity of cultivating his faculties in the natural sciences, and using his abilities there, would be likely to become a much more useful member of society? — Yes, much more. . . .

(Lord Clarendon.) The majority of the young men who are intended for the medical profession, and who come from the various public schools of the country, scarcely ever bring with them any physical science: do they? — None whatever, or very rarely.

As far as your observation goes, that is generally neglected in your profession? — Yes; and it is a want more felt by medical men than by any others. The amount of botany and chemistry required by the medical man might be as easily obtained at school, as during the time he is undergoing his medical curriculum.

I suppose you have found a sentiment of regret prevailing amongst them at the manner in which those valuable years of their lives had been employed? — Very generally.

And they would have liked to have spent them differently? — Yes, to a great extent. I never knew them regret their

classics and mathematics; quite the contrary: but they do regret very much that their faculties were not early trained to habits of observation. When they go round the hospitals, they have felt that they have not been taught to observe, and to reason upon what they observe, as might have been.

Do you think there is a general feeling amongst these men, that the study of physical science might have been added to the classics, without impairing that knowledge which they would be glad to have acquired? — That was the universal feeling.

From a Communication to the Commissioners, from Sir J. F. W. Herschel. (Vol. ii. p. 47.)

"Regarding as a 'Public School' any considerable permanent educational establishment, in which a large number of youths go through a fixed and uniform course of school instruction, from the earliest age at which boys are usually sent to school to that in which they either enter the University, or pass in some other mode into manly life, and in which it is understood that the education is what is called a liberal one, with no special professional bias or other avowed object than to form a youth for general life and civilized society, I should consider any system radically faulty which should confine itself to the study of the classical languages, and to so much of Greek and Roman history as is necessary to understand the classical authors as its main and primary feature; and should admit, and that reluctantly, a mere *minimum* of extra-classical teaching. Such a system must necessarily, I conceive, suffer the reasoning faculty to languish and become stunted and dwarfed for want of timely exercise in those years between fourteen and twenty, when the mind has become capable of consecutive thought, and of following out a train of consecutive argument to a logical conclusion. In those years it is quite as important that youths should have placed in their hands, and be obliged to study, books which may best initiate them in this domain of human thought, as in that of classical literature. To be able to express one's self fluently in Greek or Latin, prose or verse; to have attained an exten-

sive familiarity with ancient literature, and a perfect knowledge of the niceties of its grammar, prosody, and idiom, — all, in short, which is included in the idea of classical scholarship, — is no doubt very desirable; and I should be one of the last to depreciate it. But it is bought too dear, if obtained at the sacrifice of any reasonable prospect of improving the general intellectual character by acquiring habits of concentrated thought, by familiarizing the mind with the contemplation of abstract truth, and by accustoming it to the attitude of investigation, induction, and generalization, while it is yet plastic and impressible."

THE END.

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